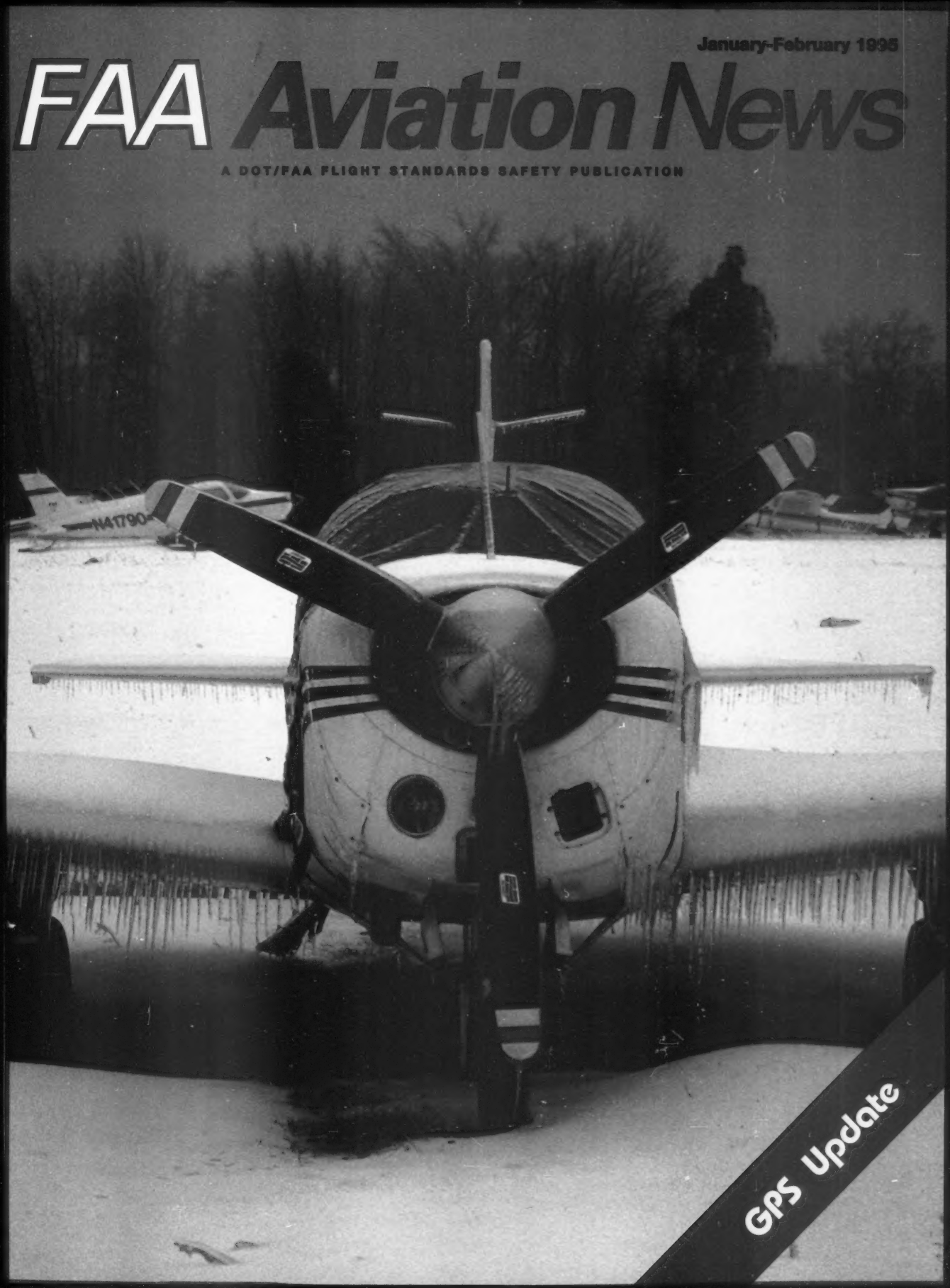
January-February 1995

FAA Aviation News

A DOT/FAA FLIGHT STANDARDS SAFETY PUBLICATION



U.S. Department
of Transportation

Federal Aviation
Administration

Federico F. Peña, *Secretary of Transportation*
David R. Hinson, *FAA Administrator*
Anthony J. Broderick, *Associate Administrator for Regulation and Certification*
Thomas C. Accardi, *Director, Flight Standards Service*
Louis C. Cusimano, *Acting Manager, General Aviation and Commercial Division*
Roger M. Baker, Jr., *Manager, Aviation Safety Program Branch*
Phyllis Anne Duncan, *Editor*
Louise Oertly, *Senior Associate Editor*
H. Dean Chamberlain, *Associate Editor*

The FAA's Flight Standards Service, General Aviation and Commercial Division, *Aviation Safety* Program Branch, AFS–810, Washington, DC 20591; telephone (202) 267–8017, FAX (202) 267–9463; publishes FAA Aviation News in the interest of flight safety. The magazine promotes safety in the air by calling the attention of airmen to current technical, regulatory, and procedural matters affecting the safe operation of aircraft. Although based on current FAA policy and rule interpretations, all printed material herein is advisory or informational in nature and should not be construed to have regulatory effect. The FAA does not officially endorse any goods, services, materials, or products of manufacturers that may be mentioned. **Certain details of accidents described herein have been altered to protect the privacy of those involved.**

The Office of Management and Budget has approved the use of funds for the printing of FAA AVIATION NEWS.

SUBSCRIPTION SERVICES
The Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402–9371, sells FAA AVIATION NEWS on subscription. Use the self-mailer form in the center of this magazine to subscribe. Cost: $15.00 ($18.75 foreign) for one year; $30.00 ($37.50 foreign) for two years. Prices are subject to change by the Government Printing Office without prior notice.

CHANGE OF ADDRESS OR SUBSCRIPTION PROBLEMS: Send your label with correspondence to Sup Doc, Attn: Chief, Mail List Branch, Mail Stop: SSOM, Washington, DC 20402–9373. Or call GPO Customer Service at (202) 512–1800/6; FAX: (202) 512–2168.

To keep subscription prices down, the Government Printing Office mails subscribers only one renewal notice. You can tell when your subscription ends by checking date on the second line of your mailing label. To be sure that your service continues without interruption, please return your renewal notice promptly.

**********3-DIGIT 342
FAN SMITH212J JUN95 R 1 423*
JOHN SMITH
212 MAIN ST
FORESTVILLE MD 20747

January/February 1995

FAA Aviation News

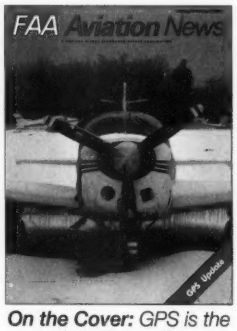
VOLUME 34 • NUMBER 1

FEATURES

Are You Ready for GPS? 1
GPS to Benefit All Phases of Flight 3
How to Fly GPS 5
Flight Amid Vertical Terrain, Part 1 7
Today's Youth . . . Aviation's Future 13
Old Cap'n, Part 4 14
Status of FAR 16
T.B.O. 18
To Pass a Practical Test 20
The A,B,C's of Airspace Operations for Ultralights 22
F.O.D. 24
Prop "Quiz" on Spinners ..... *Inside Back Cover*

DEPARTMENTS

Medical Stuff: To Fly or Not 23
FlightFORUM 25
AirspaceCORNER 25
AvNEWS/BRIEFS 27



On the Cover: *GPS is the way of the future. See articles beginning on page 1.*

The Old Cap'n strikes again. See page 21.

What's wrong with this picture? See inside back cover.

Paul Novacek

Are You Ready for GPS?

by Paul Novacek

CFI/Pilot Responsibility

Flight instructors are relied upon to be prepared and ready for any situation a student may present. Let's see if you're ready for this one.

You're a flight instructor. A student walks in after returning from the avionics shop with a new GPS installed and asks, "Can you show me how to fly an approach with this thing?"

Are you ready?

If you *are* ready, congratulations, you need not read any further. If you're not ready, you're lucky—for the moment. There are only a handful of IFR GPS approved aircraft out there, and even fewer approved for GPS approaches. But your luck won't hold out for long. Modern avionics are changing the way we fly and, with the fervor that the FAA is embracing GPS, more changes are in our future. Even if you're not ready for GPS, are you comfortable with teaching multi-leg ILS approaches with a Flight Director/Autopilot?

Traditionally, the flight instructor is responsible for training the pilot in all aircraft systems. But with the constant change of avionics in modern cockpits, flight instructors are finding it difficult to provide the necessary training. I've met many excellent instructors who admit to knowing very little about the more complex avionics systems, which prevents them from properly teaching the avionics. The FAR don't specifically require the training, and most flight instructors don't have a training source to learn complex avionics themselves.

As an avionics technician and flight instructor in the highly transient South Florida area, I see the result of pilots under-using or misusing their avionics. The corporate operators have intensive training for avionics through companies such as FlightSafety and Simuflight. The little guy may not be as fortunate or have the resources for intensive avionics training.

Some customers have entered our shop with an apparent hardware problem, only to realize that they were unfamiliar with the proper operation of their avionics.

Lack of Training

The primary concern during an aircraft checkout is the proficient operation of the aircraft. Statistics substantiate this, but the level of training should step beyond this and teach the avionics. A GPS unit or autopilot should be taught to proficiency, because this is the configuration that the pilot will be flying in most of the time.

Some instructors with whom I have talked to and flown with believe that the student's time and money is wasted by teaching the installed avionics, because the student could learn the avionics through the flight manual supplement or avionics owner's manual.

Some say that the owner's manual is a good teaching guide, but most manuals fail in this respect. Only the minimum is required by the FAA as a flight manual supplement, which is commonly not read or fully understood. Many avionics flight manual supplements were either not added to the flight manual as part of an installation or are missing.

This situation forces the student to try and learn the avionics while flying the aircraft alone, which only results in more time looking down in the cockpit and less time to see-and-avoid other traffic. Consequently, an airspace incursion may occur because of the concentration needed to learn the avionics.

Many pilots with whom I have talked would have gladly paid for avionics training when they purchased their aircraft, but no training was available. A simple check-out from a local instructor usually satisfies the insurance requirements, but the new aircraft owner is left hanging in regard to the complex avionics.

Training Need

A recent report, using pilot surveys, suggested that the pilot is ultimately responsible for **knowing** the avionics. However, the responses were varied on who is responsible for **training** avionics. Of the surveyed pilots, 58% said they don't consider any single source

for information, but a combination of sources; including flight instructors, avionics manufacturers (through manuals), avionics shops, and themselves (through trial and error). This response indicates that pilots are unsure where to obtain specific avionics training. In theory, a pilot would naturally turn to a flight instructor for training, but the report stated that only 9% of pilots look to the flight instructor as a single source of avionics training.

This percentage should be much higher, because the flight instructor is responsible for teaching the aircraft systems, including the avionics. The low number of responses suggests that the flight instructor may not be familiar with the more complex avionics, which forces pilots to look elsewhere for avionics training.

The FAA promotes the idea that the flight instructor is responsible for all aircraft systems, but many flight instructors are finding it difficult to keep abreast of the latest developments. The major reason is that avionics are changing so rapidly that any chance to experiment is usually very brief, and also partly because of the many different operating procedures among the various units (especially Loran/GPS). This leads to very little hands-on experience.

Soon pilots will be asking how to fly GPS approaches and flight instructors may be unprepared. In the flight instructor's defense, a good resource for learning avionics is not currently available. Flight instructors have the same problems as other pilots who fly many different aircraft, lack of any hands-on experience. Reading an operating manual can only go so far. When learning or teaching a new piece of avionics, especially autopilots, experience is needed.

Existing Training

Existing training is often a brief checkout from the installing avionics shop or trial and error out of an overly complex and daunting manual. A pilot who purchased an aircraft with complex avionics already installed has only the manual to learn from.

One of the educational psychology laws, the "law of primacy," states that the impression first learned will be the lasting impression. This case is true with a new flight student learning avionics for the first time.

Many flight instructors, although excellent with flight training, may not be fully trained in the use of complex avionics. The student interprets this as avionics being very difficult and needing a great amount of skill to master. The further the student progresses into more complex aircraft the greater the phobia.

Some avionics manufacturers have seen the result of user unfriendly manuals and have produced better manuals. However, most manuals still use a bottom-up approach as most pilots just want to know what buttons to push instead of understanding the total concept of how it works.

The Solution

A three part solution will be needed to train pilots in preparation for the coming technology.

First, the pilot examiners (FAA Inspector or Designated Examiner) should be familiar enough with complex avionics to be able to test applicants on the various systems and require applicants to be prepared. Second, flight instructors should learn the avionics enough to teach the systems. And finally, the students at any level should familiarize themselves with the more common systems.

Seminars

Seminars for flight instructors could be produced to elevate the comprehension of avionics. A training program tailored to flight instructors would advance their knowledge and confidence, which in turn would be conveyed to their students.

A single instructor, proficient in avionics, would teach many students. This knowledge would multiply throughout the aviation community.

An excellent passageway for instructor training is the various flight instructor refresher clinics conducted throughout the country for the required two year renewal of instructors. Instructors on their own, or flight school departments, could seek out training from avionics shops or avionics manufacturers.

Safety seminars could be set up with avionics shop managers or avionics manufacturer representatives as guest speakers. These seminars could be coordinated with the Safety Program Managers (formerly Accident Prevention Program Managers) from within the FSDO. The entire pilot population would benefit as well as instructors.

Individual Training

Another avenue for avionics training is the individual training of pilots. This is the most comprehensive and complete method of training. The pilot is taught the specific avionics by a qualified person knowledgeable about avionics. A methodical and structured lesson would be more beneficial to the student, much in the same manner as a lesson on stalls.

A comprehensive training program could be developed by designating "Avionics Instructors." A technical individual, such as a flight instructor or avionics shop manager/technician, would apply for a position as an avionics instructor in much the same way as an FAA Aviation Safety Counselor.

When accepted, this individual would receive special training to teach pilots their avionics and would work closely with avionics shops, avionics manufacturers, and flight instructors. The local FSDO, as well as FBO's, would have the names of avionics instructors in the local area. The avionics instructor would also conduct seminars sponsored by FSDO's, avionics shops, or flight schools, as well as distribute training material produced by the FAA or avionics manufacturers.

Regulatory

FAA Inspectors and Designated Examiners are not required to test an applicant on any specific avionics other than that required for the flight. This testing requirement will not motivate the student to learn nor the instructor to teach complex avionics.

The Practical Test Standards (PTS) lists avionics as part of the required tasks, but more emphasis could be

Continued on page 4

GPS to Benefit All Phases of Flight

by Marty Pozesky, *former FAA Associate Administrator for System Engineering and Development*

Research and Development

Regular users of GPS are keenly aware of its extraordinary capability for navigation. Used alone, the GPS basic signal provides unprecedented accuracy—providing position information down to within 100 meters. Used in conjunction with a Wide Area Augmentation System, Local Area Differential, and/or pseudolites, GPS can provide sufficient accuracy, integrity, and availability to support Category I precision approaches, and possibly Category II and III, as well.

Given such amazing capability, it's no wonder that aviation users worldwide are clamoring for immediate implementation. Major benefits are expected to accrue from reduced flight time, more efficient flight paths, and reduced delays—all made possible by procedures supported by better, more accurate navigation and improved surveillance capabilities.

Air traffic service providers want the same thing. Augmented GPS could mean an end to the purchase and maintenance of expensive ground-based navigation and landing systems. The Department of Transportation's Strategic Plan shows GPS to be the cornerstone of all future air navigation. At the direction of the Secretary of Transportation and the FAA Administrator, we are pursuing methods of accelerating the application of GPS technology for achieving earlier user benefits. FAA's research efforts will make this happen in the shortest possible timeframe.

The FAA is placing the highest emphasis on activities associated with achieving GPS-based navigational benefits for oceanic, domestic en route, non-precision and CAT I precision approach phases of flight. These benefits can be achieved in the very near-term. GPS's capability to provide navigational guidance for CAT II/III precision approaches and airport surface navigation, which the FAA is pursuing through ongoing research and development activities, is likely to take longer to be realized.

Domestic Enroute

The FAA has been actively pursuing a Wide Area Augmentation System (WAAS) for enhancing the basic GPS service. On April 22, the FAA's WAAS plan was presented at a Transportation System Acquisition Review Council (TSARC), which focused on the accelerated schedule for developing and implementing the WAAS. This accelerated program is consistent with the DOD/DOT agreement completed at the end of 1993 concerning the civil use of GPS. That agreement fully endorsed the development and deployment of the WAAS for integrity and availability, and approved the continued development of the accuracy capability. Deployment of the accuracy component of WAAS is pending completion of a comprehensive GPS augmentation study. This study will make a recommendation as to the optimum integrated GPS augmentation system, consistent with national security in meeting all transportation mode requirements in the most efficient and cost-effective manner.

As a result, the FAA's strategy and accelerated schedule for fielding the WAAS is to implement the system in two phases. The first phase will implement the integrity and availability components necessary for en route through non-precision approach operations; phase two will add the accuracy component needed to satisfy Category I precision approach requirements.

Once these WAAS services are available, some of the benefits to the aviation community will include increased fuel savings as a result of more direct user preferred routing, improved safety for non-precision approaches, and approach course guidance at airports nationwide. As users equip with GPS, the FAA's ground-based infrastructure will be reduced thus avoiding expenditures for replacement systems and maintenance costs for those systems.

Non-precision and precision approach

The FAA NAS Precision Approach and Landing System (NASPALS) team

TrimbleNavigation

is developing a plan that will determine the U.S. position on the future architecture and mix of ILS, MLS, and augmented GPS systems to provide Category I/II/III services. The NASPALS study is scheduled to be completed in time for presentation at International Civil Aviation Organization (ICAO) meetings planned for March 1995.

Oceanic

With a commercially available cockpit receiver, pilots will be able to use GPS as a primary means of navigation sometime in 1995. In the oceanic environment, navigation is currently achieved through the use of Omega and inertial navigation systems (INS). These systems' limited coverage, limited accuracy, and cumulative errors result in a lack of timely, accurate, and reliable aircraft position determination, reporting, and tracking, thus forcing large separation standards and artificially diminishing capacity potential. GPS implementation can improve navigation accuracy and enhance position reporting accuracy and timeliness in the near-term. In the long-term, GPS's precise data, together with satellite data link and automation, will provide the capability to make significant reductions in separation standards—perhaps by as much as 25 miles horizontally.

Surface

A GPS-based surface navigation system that meets the requirements for low-visibility surface operations can help ensure that taxiing aircraft can safely maneuver about an airport. Automatic Dependent Surveillance (ADS) is made possible by GPS technology and is the foundation of FAA's surface surveillance and automation development efforts. The use of GPS position reports significantly improves information needed to effectively control ground traffic at the nation's busiest airports. Using ADS, aircraft will report position, identification, and speed periodically, thus reducing the chance of surface conflicts and runway incursions. In 1995, the FAA will develop standards for cockpit moving maps. These electronic maps will appear on pilot's navigation screen, depicting the airport surface, the pilot's current position, and the route of taxi to and from the terminal gate. This technology will increase safety and efficiency when operating in extremely low visibility, or at unfamiliar airports. The increase in efficiency has the potential of further reducing delays and airline costs.

Traffic alert and avoidance

The FAA is also supporting the development of a low-cost proximity warning system for general aviation using GPS technology. Each cooperative aircraft first determines its own location from an onboard GPS receiver, then transmits that information to other nearby aircraft and ground sensors. In the system envisioned, an aircraft equipped with a GPS-based proximity warning system would also "see" and be "seen" by aircraft equipped with the traffic alert and collision avoidance system.

The initial investigation of the feasibility of this technology is being carried out for the FAA by the Rannoch Corporation under a Small Business Innovative Research contract. The FAA is also participating on a user panel to define the system's technical specifications and operational performance. If the effort to define the technical specifications is successful, the FAA will consider supporting the development of prototype units and an evaluation program involving the system users.

The versatility and potential of GPS make it one of the highest priority programs within the FAA for the foreseeable future. ■

Are You Ready for GPS?

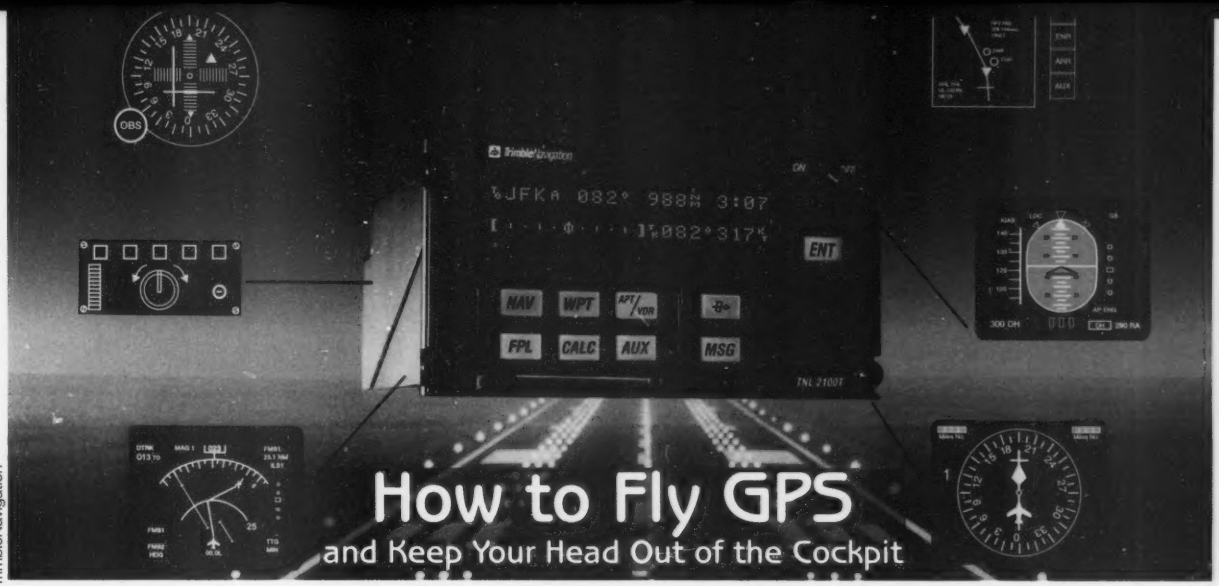
Continued from 2

given to the new technology, especially GPS. A change in the PTS should include a discussion about complex avionics, such as autopilots or GPS. Even if the applicant's aircraft is not equipped with complex avionics, a required discussion with the examiner will motivate the student to study and learn the more complex systems.

Avionics capability is changing at an exponential rate, without the needed expansion of available training. If we don't start to talk about the various issues that I've outlined, the future will be a very confusing place.

Do you still think you're ready? ■

Paul Novacek is an avionics technician for Palm Beach Avionics in Boca Raton, Florida. He has a Bachelors Degree in Avionics from Embry-Riddle, and is a Commercial pilot with CFI, Multi, Glider and A&P ratings. He is an FAA Aviation Safety Counselor and conducts avionics training seminars for pilots and instructors. Paul has just published a research paper entitled "Human Factors Related to General Aviation Avionics Training" of which this article is a brief excerpt.



TrimbleNavigation

How to Fly GPS

and Keep Your Head Out of the Cockpit

by Bill Coons, *FAA Aviation Safety Counselor*

Putting It All Into Practice

The FAA has been reporting that more and more pilots are becoming lost even though they have the newest, best navigational gadgets money can buy. Unfortunately, pilot skills are becoming unused in favor of LORAN and GPS. Make this year accident free by using all the NAVAIDS available in your airplane. This includes LORAN, GPS, and pilotage. In other words, don't become a statistic by relying on only *one* mode of navigation.

Read on . . . .

"Whadda ya mean draw the line on the map? I haven't done that since I made my last cross country flight when I was a student pilot. Besides I got me a brand new handheld GPS. All I have to do is twist a few knobs. So what if it takes a little twiddling. Maybe a minute or so and I'll have that little dude all programmed and ready to take me wherever I wanna go. Besides, it's got all them other bells'n whistles to play with along the way. I tell ya it's like havin' your own little video game right here in the cockpit. I can tell the time, dial up the nearest airports, see what time the sun rises and sets, and it even tells me what time I will get there.

"Draw a line? Not me, sport. That went out with VOR's. Besides I don't look out the window much. It all looks the same down there. And another thing, if you can't figure the thing out, it comes with a dandy instruction book to look at and I can figure it out right there in the cockpit."

Okay, so maybe I've stretched it a bit, but seriously, with all of the features built in the new GPS units, it doesn't take a rocket scientist to figure out that the new units really take the work out of navigation. The problem is it's so easy that most of the navigation skills you learned in training and have been using all along might become obsolete in your mind and therein lies the problem that may compromise safety.

Certainly, GPS is here to stay and if there is any doubt, look at all of the different brands on the market and the steadily falling prices. Most manufacturers offer the standard features—heading, ground speed, distance, ETA, nearest airports, VOR's, NDB's, and so on—until you have more information than you can ever use. The problem arises when the pilot spends more time trying to figure out the system than looking out of the window.

By now I'm sure you are aware of how GPS works and how accurate it is. So is it really necessary to draw the line on the map and follow your course with your thumb? Of course it is . . . that is, if you are interested in making sure that you are where the GPS says you are.

Let's plan a short cross country flight of 100 miles or so. Remember, safety dictates that we must be aware of all that goes on around us. That simply means keeping our head out of the cockpit, and that is easier said than done. What a temptation to play with the knobs, while the airplane does what it does the easiest—to head for the ground when nobody is flying it.

Draw the line? Yep . . . it only takes a minute, and you already know how to do that. Now, mark off every 20 miles on the line starting from the destination all the way back to the departure point. Then, (and I'm assuming that you are doing this at home) start programming the GPS. If you have a library function in your GPS start entering most of the airports on your course. This may seem redundant because the nearest airport key will pull up the same airports, but only if they are close by.

Now, with the line drawn and marks every 20 miles and the aircraft preflight complete, are we ready to fly?

Not really. One more consideration—just where is the GPS located? With panel-mounted units you don't have much choice. The closer to the top of the panel the better. With handhelds, you have a variety of locations available. The best is, of course, on the yoke. Most handhelds have a handy bracket for just that. In lieu of that, the next best choice is still close to the top of the panel. The closer you get it to the top, the easier it will be to keep one

eye out of the cockpit. The worst possible location is on the floor or between seats. Trying to look at the GPS or possibly programming it there is downright dangerous. Moving your head up and down can make you dizzy or worse.

Most units come with an antenna that can be placed on the glare shield or on top of the panel. The main concern here is to keep it at least eight inches from the magnetic compass. The GPS will radiate a small amount of electromagnetic energy, and the compass will give incorrect readings.

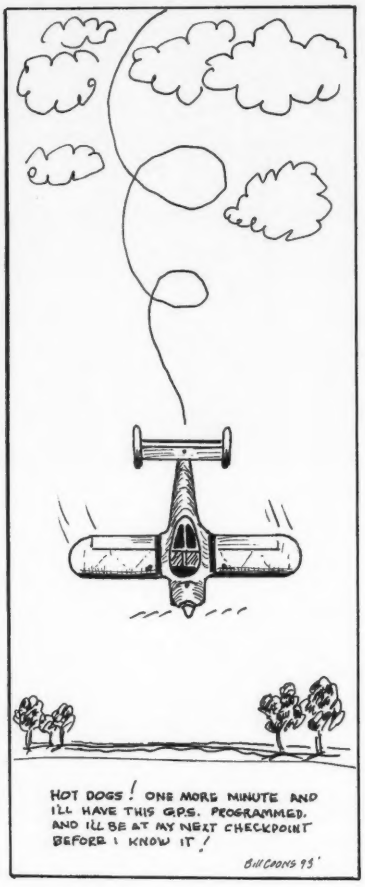
Okay, the GPS is on the yoke and programmed for the destination. Seems like a lot of work to get to this point, but it only takes a few minutes to do all of that. Now can we fly?

Absolutely. One thing I should mention here is that when you programmed in your destination, you were in effect drawing an imaginary line from departure to destination right in the GPS itself. That line will remain there and as long as you keep the needle centered on the CDI, you will be right on course.

As you take off and fly upwind you will notice that the CDI is moving. That is because you programmed it using the tie down spot as the departure point. Now it simply is a matter of turning back until the needle is centered again, and you will be on the line in the GPS. You also will be on the line that you drew on the sectional, give or take a slight great circle route correction. Two lines going to the same place and now you know that you are on at least one of them. Should give you a good feeling right there.

Now comes the fun part. Cruising along, all gauges in the green and the CDI centered, what could possibly go wrong? Probably nothing. You have done everything right so far. The readout says you are eighty miles from your destination, your ground speed is great, and you will arrive at noon. A quick look at the sectional, and you find that the little town or lake at eighty miles is exactly where it is supposed to be. As long as everything is that good, let's try the nearest airport function.

Up to this point it has not been necessary to do anything to the CDI except glance at it—just as it should



be. After checking outside the window go ahead and hit the button. Most units will allow this with a single key stroke. Its amazing how many airports are within a short distance from your location. That didn't take long and the time away from the outside was only a few seconds. Isn't it comforting to know that there may be an airport within gliding distance?

Now you are forty miles from your destination. A check at the forty mile marker on the sectional shows the exact checkpoints, the course has been right on three four zero for the last fifty miles, and that was what it took to keep the needle centered. That little town with the railroad tracks is right below you, and your thumb is right there too. Things are good—too good—and then the worst possible thing that could happen during a flight does happen. Your worst nightmare. The GPS quits. What now?

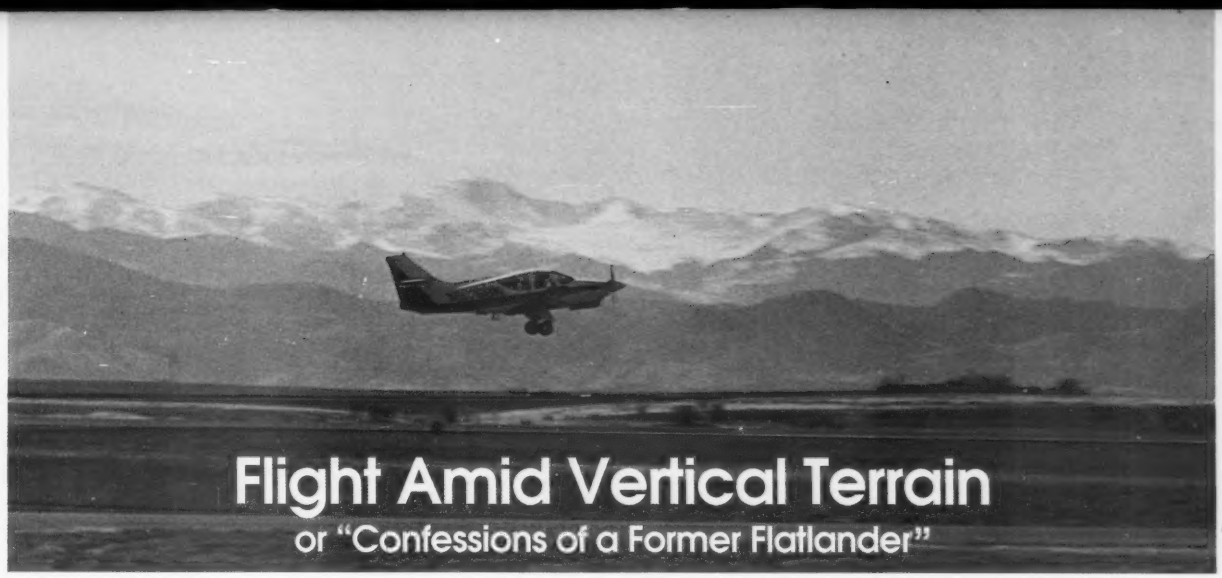
Not to worry. Keep your present heading and, except for a sudden change in the wind, the airplane is oblivious of any problem at all. It's right where it is supposed to be. I will guarantee you that you will reach your next mile marker with no problem as long as you hold your heading.

While you are waiting for this to happen you remember that you had batteries with only a partial charge when you left home and just happen to have spares with you. Some handhelds have battery compartments with slides and with others you must use a screwdriver to open the battery case. This can be a real chore while you are concentrating on flying. The safe way is to load one battery at a time and alternate looking out of the cockpit in turn. One battery, one look. Well, now you have succeeded in getting the GPS back on line but somewhere in the process you have accidentally strayed off the course a mile or so. With only thirty miles or so left in the trip you might consider resetting the needle for a new course instead of flying back to the original one, but resist the temptation. As soon as you do, you have erased all of the information for the trip. Your checkpoints are gone forever, and the line has disappeared also. You will have a new course and a new line in the GPS. However, if you change your mind and want to return to the original line you can do so.

The newer GPS units have this function built-in. You enter your original departure and destination and it will restore the original course. If you have to do it the hard way, you enter your original departure and destination and it will restore the original course. It will now tell you which way to fly and for how far to put yourself back where you started before the battery failure. There is no need to complicate matters with one course and line on the GPS and a different one on the sectional.

Okay, we are back on course and in a few minutes you have the airport in sight. Nothing really left to do but wait for the beep or flashing notice that you have arrived at your destination.

Continued on page 12



Flight Amid Vertical Terrain

or "Confessions of a Former Flatlander"

by Kevin D. Murphy

Part One

This four-part series is meant primarily for general aviation pilots flying light single engine airplanes without turbochargers, although the information will be useful for pilots of nearly any type of aircraft. Most of the information will be valid for any type of mountain flying, whether in the (relatively) low Appalachians of the East or the much higher and more jagged Rockies of the West. Because of the higher and more jagged nature of Western terrain, examples are mostly placed in that area.—Editor.

Mountain fliers sometimes refer to pilots from the eastern part of the country as "flatlanders." It's a common term in the Western aviation community—a description of a pilot who hasn't yet thrilled to touching down while the altimeter still reads 7,000 or 8,000 feet. Occasionally the word is used more pejoratively, such as at the crash site of a pilot who didn't believe a mountain flying checkout was necessary.

I confess: I used to be a flatlander but was fortunate enough to be able to add mountain flying to my aeronautical resume. For several years after that, my full-time job was encouraging aviation safety among general aviation pilots in New Mexico, where elevations range from the (relatively) low but scorching hot 3,000-foot deserts to snow-capped mountain peaks of over 13,000 feet. I taught safety seminars as a volunteer in the FAA's Accident Prevention Program (now Aviation Safety Program), counseled as an FAA Accident Prevention Counselor with pilots about to make hideous mistakes, and wrote aviation safety articles for several national aviation magazines. And I flew many of the very best hours of my 25-year life as a pilot.

Mountain flying is different but rewarding beyond any measure. In this four-part series, I'll pass along some of the strange and wonderful experiences of a flatlander learning mountain flying. Emphasis will be on the most common mistakes that cause accidents. Along the way, I'll offer maxims of mountain flying wisdom in little nuggets called *Observations of a Former Flatlander* (OFF).

Before we start, one caution: ***Do not, under any circumstances, try flight in high density altitudes or mountainous areas without a thorough checkout from an experienced mountain pilot.*** To do otherwise invites the label "stupid pilot tricks," and Western landscapes are already littered with aluminum carcasses put there by pilots who discover in the last minute of their lives that reading about some aspect of mountain flying—say, density altitude—is not at all the same as experiencing it. The consciousness-raising that occurred in their last minutes could not have been pleasant. Once you've had a thorough checkout, wade in slowly. Lessons learned slowly are those learned best.

Density Altitude

When I was a student pilot in the late 1960's, learning at an East Coast airport 186 feet above sea level, the instructor kept admonishing me to keep my right hand pushing the throttle full forward during takeoff and climb.

"How else can you be sure you're getting full power?" he would scream over the roar of the engine.

At lower-elevation airports, pedal-to-the-metal is a reasonably complete explanation of how to ensure full power. For mountain flying, it's only the start of the explanation, which goes on to include the effects of thin air in two places: just outside the cockpit and between the pilots' ears.

If there is any one basic reason why flatlanders come to grief on vertical terrain, it is lack of a true understanding of how the thin air of higher elevations—defined as a high density altitude—causes aircraft performance to wither.

Oh, sure, ground school instructors always cover density altitude, usually while tracing lines on performance charts. "And notice the extra 50 feet of runway required for takeoff when the temperature rises by 20 degrees in this example," the instructor will say, stifling

a yawn. "Of course this chart you will see again in the exam booklet makes it awfully hard to calculate exact numbers."

So what exactly is density altitude? Technically, *density altitude is pressure altitude corrected for non-standard temperature and humidity*. If you need to re-learn calculations required to determine density altitude, refer to the sample charts in the article, "Density Altitude," that appeared in the September 1994 issue of *FAA Aviation News* or refer to the pilot operating handbook for your aircraft or to any of the various, commercial study guides.

In mountainous areas, density altitude is more than an idle concept and is frequently the subject of pilot conversations. Remember the ground school mnemonic "high, hot, and humid?" Those conditions create a high density altitude, meaning thinner air and decreased aircraft performance.

"High" refers to elevation or altitude. Almost every pilot knows that the atmosphere gets thinner as the houses get smaller, but mountain pilots get to experience the most serious effects of thin air on takeoff and landing more often than lowland pilots.

"Hot" is temperature, with higher temperatures making the air thinner. Elevation and temperature are the two biggest factors in determining density altitude. Some high elevation airports have large thermometers displayed just outside the FBO office, with density altitudes marked next to temperatures. As the temperature climbs, so does the density altitude.

"Humid" has the least impact on density altitude and is usually ignored in all but the most precise calculations. Humidity increases density altitude (makes the air thinner) because saturated air actually weighs only about ⅝ as much as dry air. Think of the chemical formula for water, H_2O: Two molecules of lighter-than-air hydrogen and only one of oxygen allow humidity to "lighten up" the surrounding air. Humidity also causes a slight decrease in engine performance.

Thinner air (high density altitude) means an aircraft will have a longer takeoff run, a slightly longer landing run, and a lower rate of climb. In short, if you think your airplane doesn't have enough power while operating near sea level, you'll really be unhappy with the performance at higher altitude airports!

High density altitude outside the cockpit is relatively easy to understand and appreciate. High density altitude between a pilot's ears, however, is quite another matter and is the root cause of about 80% of mountain flying accidents. For most beginning mountain pilots, the first flight in true high density altitude conditions is a revelation.

One hot summer day, I rolled onto the end of the 10,000-foot Runway 17 at Albuquerque International Airport in a fully loaded Cessna 172 and pushed the throttle forward. Although Albuquerque is only a little over 5,000 feet above sea level, the blistering summer heat that afternoon pushed the density altitude at the airport close to 9,000 feet.

In the right front seat was a friend of mine—a private pilot from near sea level on his first visit to the West—who had assured me he had studied carefully the effects of density altitude. At first he marveled at the lack of the usual "whiplash" caused by rapid acceleration. But as a couple thousand feet of Runway 17 ambled by, he turned to me with concern and said, "Ummmm, are you sure this airplane is going to fly?"

My private pilot friend had done all the ground school computations, read the proper books, but had never actually FELT such a sluggish, prolonged takeoff run in a Cessna 172. We finally staggered off the runway and leveled off in ground effect. As we continued to float toward the end of the runway, his eyes were big as inspection plates.

"This is normal," I reassured him. I thought a little humor would put him at ease, so I added, "We're just waiting for a thermal so we can climb."

Ooops! Humor isn't always well taken by beginning mountain pilots who are seeing the effects of high density altitude for the first time. My friend was doing a quick mental review of his will.

Especially in the desert southwest, summertime thermals really do help in gaining altitude after takeoff. It's just that most of the time they're not essential to continued flight, and if they are, you're probably doing something wrong—which leads us to OFF [Observations of a former Flatlander] Number 1:

OFF #1: Summertime thermals are a wonderful bonus, but don't count on them in your pre-takeoff planning.

Airspeed

"Airspeed is airspeed the world over, as long as it's indicated"

Another part of ground school often forgotten quickly after the written examination or the private pilot checkride is the difference between indicated airspeed, calibrated airspeed, true airspeed, and groundspeed. Don't worry—your first takeoff in high density altitude conditions will remind you of the difference.

"Indicated airspeed" is the "raw" value you see on the face of the airspeed indicator. It's nothing more than a measurement of how many slugs of air have been packed into the small opening in the pitot tube, compared with air pressure felt by the static port on the side of the fuselage, and translated into miles per hour or knots.

"Calibrated airspeed," found by checking a chart in the aircraft's manual, takes into account the position of the pitot tube and other variables that cause inaccuracies. In most aircraft, the difference between calibrated airspeed and indicated airspeed will be smaller around normal cruise speeds.

"True airspeed" is calibrated airspeed corrected for non-standard temperature and pressure. Most pilots doing regular cross countries enjoy seeing the spread between calibrated (or indicated) and true airspeed increasing as they gain altitude.

"Ground speed" is true airspeed plus or minus the effects of headwinds or tailwinds.

These differences become obvious on your first takeoff at a high density altitude. At lower elevations, true airspeed (and groundspeed, assuming no wind) isn't much different from indicated airspeed. After a few hundred takeoffs, most pilots develop a "feel" for

how fast the runway lights must whiz by before hauling back on the yoke, and reliance on indicated airspeed wanes. But at high density altitudes, true airspeed is greater than indicated airspeed, and runway lights must whiz by at a greater rate for the same indicated airspeed. The result is something mountain instructors have come to expect: pilots trying their first high-altitude takeoff sometimes try to pull the airplane off the runway too early because the speed of passing scenery "looks right" for liftoff. During the summer at some of the highest mountain airports, the difference can be as much as 20%.

Relying on indicated airspeed is the answer to this problem. *For takeoff, landing or maneuvering, the same indicated airspeeds will work just as well at sea level as they do at 12,000 feet density altitude.* If you normally use 70 knots indicated as an approach airspeed at low elevation airports, that same 70 knots indicated will work just as well at Leadville, Colorado, elevation 9927′ MSL. Of course your true airspeed—and groundspeed, assuming no wind—will be higher, for considerably lengthened takeoff and landing rolls.

OFF #2: Use the same indicated airspeeds for takeoff and landing as you did at low elevation airports, and don't let yourself be thrown off by the speed of the passing scenery.

Lift off

"Off and climbing or, not all airports are created equal"

Not long after liftoff, another important lesson about density altitude will become obvious. This is sometimes referred to as the "Ohmygosh, we're not going to make it over the trees, are we?" lesson. Rate of climb suffers horribly as the elevation and temperature rise.

Runways in higher terrain are usually longer than those in lower terrain, giving novice mountain pilots a false sense of complacency. Tall trees or other obstructions may LOOK far enough away, but the abysmal rate of climb of most light airplanes in high density altitude conditions makes the obstructions much closer than you think.

Colorado Pilots Association, Mountain Flying Course

Leadville airport looking north.

Frighteningly close, in some cases. Pull out the performance charts for the airplane you normally fly and note the dramatic decrease in rates of climb as the elevations and temperatures get higher. In all your low-elevation experience, such a decrease in rate of climb would naturally make you exercise caution. But consider this: rate of climb is expressed in *feet per minute*, and at high density altitudes you're covering more ground each minute than you did at lower elevations. The effects are cumulative.

Increased takeoff rolls and decreased rates of climb aren't the only considerations in planning takeoffs in mountainous areas. At some mountain airports, there are sloping runways, deceiving terrain, and official or unofficial departure procedures. Since planners don't usually have the luxury of large expanses of flat land, sloping runways are quite common in mountainous areas. Not many runways slope more than a couple percent, although a slope of slightly less than one percent is enough to earn a special mention in the FAA *Airport/Facility Directory* and some other airport information publications. All other things being equal, it's best to take off downhill and land uphill, letting gravity help counteract high density altitudes.

But other than a mention of slope in an airport directory, how would a pilot know about balancing wind velocity with the slope of a runway? Like so much other education about mountain flying, the answer is to ask the local pilots. Not only do they know, but they'll be absolutely ecstatic that you asked. If there are no local pilots to ask, add about 10 percent to your takeoff distance per degree of upslope; if the slope is more than about two degrees, seriously consider taking off downslope. A downslope takeoff shortens your roll by about 5 percent per degree of downslope.

You'd think that airport management at such airports would be eager to publish such information in airport directories, but that isn't always the case. Liability concerns are usually to blame for the lack of an entry. As one county manager told me, "So we tell them to land uphill regardless of the wind, and then somebody wrecks his airplane and sues us. We don't have that much money."

There are a few mountain strips—mostly private—where the direction of landing is obvious. One that sticks in my mind is at Silver City, New Mexico, near the Gila Wilderness, where the short dirt strip of a private airport there slants almost 10 degrees. One look is enough to convince any pilot that trying to land downhill on that strip would be

a serious mistake. Oh, and by the way, that strip is fewer than 2,000 feet long! (For landings on sloping runways, one bit of caution: Landing uphill is normally desirable, but an approach to an uphill runway causes an optical illusion of being too high on the approach.)

Many mountain strips used by the U.S. Forest Service or other Federal agencies not only slope but are also irregularly maintained, and soft field takeoff techniques are frequently required. Adding some flap before takeoff increases the lift and reduces the beating taken by the landing gear and other parts of the airplane, and pilot operating manuals for airplanes built in recent years usually specify a flap setting for best soft field performance. If your airplane didn't come with such a recommendation, you can usually approximate the proper amount of flap by moving the one aileron to full down deflection with your stick or yoke and then matching the flap to that deflection. This usually provides maximum lift from a particular airfoil design without inducing excessive drag.

Short back-country strips of tall grass, sand, gravel, or soft turf can also cause considerable consternation because takeoff distances are usually calculated for hard-surfaced, level runways. A conservative rule of thumb uses the halfway point of the runway as a reference: If you haven't reached about 70% of the needed liftoff speed by the halfway point, abort.

Deceiving terrain is also quite common surrounding mountain airports. At one of my favorite mountain resorts the runway is nearly 8,400 feet above sea level, is oriented north and south, and slopes slightly downhill to the south. The terrain going south beyond the end of the runway doesn't look like much more than a very small hill, but appearances are deceiving; and more than one pilot has found that the hill is higher than it appears—especially in the summer when the airport attracts a large number of flatlander pilots. There have been several accidents at this particular mountain airport, despite an exceptionally well maintained wide runway that is about 9,000 feet long and in a wide valley. After one particularly heart-rending accident where a pilot took off to the south and wasn't able to out climb the hill and the airplane burst into flames, consuming one of the passengers, the county agreed to post signs advising pilots that there was "rapidly rising terrain to the south." In addition to the signs, a lineperson from the FBO rushes out to greet each incoming airplane with a sheet of paper that thoroughly explains why high density altitudes deserve serious consideration. The last time I stopped in, the lineperson had the explanation sheet in my hand before I'd even stepped out of the airplane.

Departure procedures are also common in mountainous areas, but many flatland pilots aren't aware of them. They come in two flavors: VFR and IFR. Most VFR departure procedures in mountainous terrain are "unofficial," but no less important than their "official" IFR cousins. Departure procedures are nearly always established to help pilots avoid those "Are we gonna make it?" blues that accompany rapidly rising terrain. Unfortunately, the only way to find out about most local VFR departure procedures is to ask local pilots or check the FBO.

VFR departure procedures are usually easy to understand and follow. For the resort airport where county commissioners posted the "rapidly rising terrain" signs, the VFR departure procedure calls for a departure to the north (slightly uphill), then proceeding straight ahead just a short distance to a lake, then circling the lake while climbing high enough to clear mountains that stand between a pilot and his or her destination.

IFR departure procedures are also not well understood, even by some instrument rated pilots who normally operate in lower, flatter terrain. Some think a departure procedure from a mountain airport means a Standard Instrument Departure (SID) and will search their approach charts frantically for a copy of that procedure. No, an IFR departure procedure is not a SID. If an airport has either non-standard takeoff minimums or an IFR departure procedure, a small "T" in a dark inverted triangle will appear in the "notes" section of NOS instrument approach charts for that airport. The note refers to a listing at the beginning of that approach chart booklet, where the departure procedure can be found. Most IFR departure procedures are nearly as straightforward as the VFR "unofficial" procedures. Often the procedure is as simple as proceeding to a beacon (frequently a non-directional beacon or a marker beacon on an instrument approach) and climbing in a holding pattern until reaching a minimum altitude, then turning on course. At airports with good radar coverage, radar vectors may substitute for the departure procedure, although wise pilots have the non-radar procedure well in mind.

Taking off from high elevation airports and climbing at an excruciatingly slow rate brings to life ground school lessons on best angle of climb and best rate of climb (V_x and V_y, respectively) speeds. At the outer edge, knowing and holding V_y may make the difference between climbing and not climbing. Also often forgotten is that the best rate of climb speed decreases as the density altitude increases. Eventually, the best rate of climb speed meets the best angle of climb speed. In fact, that's one of the special burdens of a mountain checkout: knowing the different Vy speeds for different altitudes.

In many cases, mountain flying means operating near the limits of an airplane's performance. When flying IFR on airways, for instance, the minimum altitudes necessary to avoid higher peaks are frequently above 9,000 or 10,000 feet and go to well above oxygen altitudes along some routes. There's not a whole lot of climb performance left in the average non-turbocharged light single engine airplane when trying to maintain a minimum enroute altitude of 12,000 feet. All it takes to make one ineligible for further participation in the system is a slight downdraft.

When operating that closely to an airplane's performance limits, wise pilots pay special attention to upward changes in minimum enroute altitudes or minimum crossing altitudes. With the dismal rates of climb available at those

altitudes, more than the usual prior planning is necessary for pilots who want to reach the new altitudes without saying, "Ooops." One rule of thumb used by many mountain pilots when planning IFR flights is to keep a minimum climb performance of 300 feet per minute.

OFF #3: Ask the locals. They don't want your airplane blocking their runway, either.

Weight and Balance

There's a theory that gravity is slightly less at high elevations, making an entire airplane and its contents weigh less, thus allowing a pilot to cram more stuff on board and still remain legal. Is that true? I don't know. But for flight at high density altitudes, it doesn't matter. Light aircraft in high density altitude conditions are routinely operated well *under* the manufacturer's gross weight, in part to maintain a reasonable level of performance. Especially when temperatures soar, keeping the weight down may be the only way to complete a trip in mountain country safely.

Not all pilots visiting high country for the first time understand the difference between manufacturer's gross weight and a realistic operational gross weight. I saw a good example of that one hot summer day at a busy general aviation airport that is located just shy of one mile high—5,270 feet above sea level. The blazing sun was pushing mercury in thermometers to near 100 degrees, and the blacktop of the 4,000 foot runway could have made a stovetop. A friend and I were sitting on park benches just outside the FBO office, enjoying the shade and light breeze and grading takeoffs and landings.

In came a Beech *Bonanza*, sizzling down final approach. As we watched, it flew past the approach end of the runway at about 50 feet, touched on all three wheels at about the halfway point on the runway and barely screeched to a halt just short of the runway end. We could see every seat in that six-seat airplane filled as it taxied in. The airplane pulled up to the ramp in front of the office. The door opened and a rather large woman climbed out, stepping cautiously down the walkway on the right wing. Then the pilot emerged, and it was obvious he hadn't missed many meals either. We could see four adults filling the rear seats, and the small baggage compartment at the rear was also stuffed.

"Lineboy!" yelled the pilot, standing on the wing, just outside the door of the Bonanza. Sweat was pouring down his forehead. "Top everything! We gotta get going!"

There were two of us sitting on that park bench in the shade, and we quickly flipped a coin to see who would counsel with this pilot. I won—or lost, depending on your perspective.

"Sir, before you add 400 or more pounds of gas to that airplane, could we talk about your chances of getting off this runway and avoiding those trees at the south end?" I waved at the rather sturdy stand of 50-foot trees that stood just a couple hundred feet from the departure end of the runway. The fact that they provide shade for a nearly full cemetery has always been an effective selling point for pilots who weren't otherwise willing to listen.

As we suspected, this was the pilot's first trip into high density altitude country, and he was determined to make it further west—Phoenix, I think—before the sun set for the day. Density altitude was not on his mind. We sat in the comfortable lobby of the FBO with weight and balance charts and performance figures for his airplane, and it didn't take long for him see the light. Or perhaps he felt the heat.

"I probably wouldn't have made it, would I?" he asked, new respect in his voice. "I've never questioned before whether 4,000 feet of runway was enough, even with tall trees at one end."

At the end of our short ground school session, the pilot had decided to take on a smaller fuel load, plan an intermediate fuel stop and stay overnight to take advantage of lower temperatures early in the morning. It was a wise decision.

In truth, 4,000 feet of runway really can be marginal, especially on hot days and with full loads and especially if obstructions bar one end of the runway. Even longer runways can be marginal, like the 4,800 foot runway at Leadville, Colorado, the highest airport in North America. On hot summer days, density altitude can soar to 13,000 feet at Leadville. For obvious reasons, you don't see very many Cessna 152's or Piper *Tomahawks* at high altitude airports like Leadville. A friend of mine instructed there several years ago, and at that time the lineup of airplanes based at Leadville included a Piper Cherokee 180, an old Cessna 182, a 160-HP Piper *Tri-Pacer* and a Piper *Super Cub*. The *Tri-Pacer* and the Cessna 182 were commonly used for instruction, although the *Tri-Pacer* was regarded as a two-place, limited fuel airplane. Ramps at higher elevation airports tend to look a little different from

Colorado Pilots Association, Mountain Flying Course

Glenwood Springs airport looking south.

those at lower airports, too, with beefier airplanes preferred. Where one might find an ocean of Cessna 172's at low elevation airports, Cessna 182's tend to predominate at higher elevation fields.

OFF #4: Gross weight for safe flight in high density altitudes often is less than what the pilot operating handbook claims.

Physiology and the Pilot

A couple of years ago, I was teaching a private pilot ground school in the high country. We had slogged through basic aerodynamics, navigation, communications, and powerplants and had finally reached "effects of altitude on the body." The need for supplemental oxygen was the subject at hand, and I drew a diagram on the blackboard showing the FAR requiring oxygen for the pilot after 30 minutes above 12,500 feet and up to 14,000 feet and all the time for the pilot above 14,000 feet cabin pressure altitude. So far, so good.

"But those are only the rules," I explained earnestly. "You may very well find oxygen useful at lower altitudes to avoid hypoxia, especially at night. In fact, the recommendation is for supplemental oxygen when flying above 10,000 feet during the day and above 5,000 feet at night." A slow snicker started at the back of the room and spread towards the front. As a former flatlander, I hadn't recognized the basic flaw in this otherwise solid piece of ground school advice. Every student in that classroom, on the second floor of a large hangar at the international airport, was already at 5,400 feet MSL.

"So we should strap on an oxygen bottle to do the preflight?" suggested one student, barely containing himself. The whole class erupted in laughter.

It's true that much oxygen is bottled, sold, and used in the high country. It's also true that pilots who live at higher elevations are slightly less susceptible to hypoxia, because their bodies have adapted. After about two months living at a higher altitude, hearts become capable of pumping larger amounts of oxygen-carrying blood, the blood cells themselves carrying oxygen increase in number and individuals may breathe at a slightly faster rate. On the downside, that acclimatization is lost very shortly after return to a lower elevation.

Symptoms of hypoxia include either an increased sense of well-being (or sometimes a sense of feeling terrible), slowed reaction time, impaired reasoning, fatigue and headache, and decreased night vision. The majority of mountain pilots don't use oxygen while flying below 12,500 feet during the day, despite all the best recommendations to the contrary. In part, their bodies have adapted to life at higher elevations. But at night, oxygen use is another matter. Loss of night vision is one of the first symptoms of hypoxia, and it's tough enough to fly VFR at night without being able to see clearly. Mountain peaks don't have obstruction lights, and without a full moon it's virtually impossible to see high terrain. A large number of mountain pilots simply refuse to fly at night, and those who do prefer to stick to the lower-elevation routes marked by a prominent land feature. Personally, I always preferred Interstate highways, with their steady trail of white and red lights leading the way to (mostly) obstruction-free terrain.

OFF #5: Clean living pays off in reduced flying costs, since bottled aviator's oxygen costs money.

Part two of this mountain flying series will offer helpful hints for getting and evaluating weather, and using winds to help you gain altitude when the density altitude is high. ■

NOTE: Even though this article was written exclusively for FAA Aviation News, *its author has copyrighted it. To obtain permission to use this article or any part of it, contact the author at (301) 695–2131; fax (301) 695–2375.*

How to Fly GPS

Continued from page 6

The chances of living this scenario are very slight, because you should have loaded new batteries at home or used the optional power source. Loss of battery power is one thing and can usually be corrected, but inexperience and lack of knowledge of your particular GPS is inexcusable. The GPS manual will take some time to digest, but certainly is worth the effort. Be thoroughly familiar with all of the functions, practice at home, and, while flying, include it in your instrument scan.

The accuracy of GPS is without question, but unless you use it correctly, and keep your head out of the cockpit, it may not prove to be your friend at all. To depart and arrive may be a means to an end. Just make sure that it means the end of a perfect flight, and not the end of you. ■

Bill Coons is an Aviation Safety Counselor in the Great Lakes Region. This article and cartoon originally appeared in April 1994 issue of Coupe Capers, *the Ercoupe newsletter.*

Black History Month **PROFILE**

Today's Youth...Aviation's Future

by Stephanie J. Webb

"We cannot always build the future for our youth, but we can build our youth for the future."
—Franklin D. Roosevelt

This summer, the Kansas City Downtown Airport served as the backdrop for a revival of a spirit reminiscent of the 1930's and 1940's when pools of air enthusiasts organized to promote aviation in the black community. The Phoenix Committee, a non-profit organization, took on the tremendous task of hosting its first Aviation Education Youth Summer Camp for disadvantaged students in the Kansas City area.

Diverse in many dimensions, this impressive group of people from the aviation community gathered at the Downtown Airport on July 23 and 24 to introduce 25 inner-city students to the full gamut of opportunities, excitement, and benefits offered by aviation. The Phoenix Committee and its predecessors were inspired by the legacy of Bessie Coleman, the first licensed black pilot in the United States.

One of the aims of the Phoenix Committee, co-founded by two air traffic control specialists from the Kansas City Air Route Traffic Control Center, Gerald Bagby and Charlie Davis, is to annually use elements of aviation education to help inner-city students improve their education, learn life skills, develop confidence, become responsible citizens, and plan for successful, fulfilling futures in a global society.

The first day agenda included a highly interactive discussion with a 14-member panel where students gained insights on how each panel member had arrived to his/her current position. What motivated him or her? What kind of obstacles did each go through to progress?

Workshops leaders talked with students about topics such as the history and influence of aviation in the Kansas City Metropolitan area, Blacks in Aviation, how to prepare for aviation careers, and what it means to have the "aviation bug".

The following day, two pilots from Minneapolis, MN, joined several local pilots in helping students become familiar with the parts of an aircraft and to simply talk "airplane talk".

Among a list of people and groups supporting the Phoenix Committee's inaugural event were: The Kaufman Foundation; The School District of Kansas City Missouri; Tuskegee Airmen, Inc.; Heart of America Chapter; the Kansas City Aviation Department; Negro Airmen International; Central Region Federal Aviation Administration; MidAmerica Aviation; Maplewood Community College; Executive Beechcraft; and the Kansas City Metropolitan Chapter of the National Black Coalition of Federal Aviation Employees. ■

Historian Colonel Charles McGee (standing), retired U.S. Air Force, opened the window of history for students to learn about the Tuskegee Airmen of World War II and other facts on blacks in aviation (center column).

Pilot Coleman Radar, member of the Minneapolis Chapter of the Negro Airmen International, explains cockpit controls and instruments to a participants in the Aviation Education Youth Summer Camp (above).

Ms. Webb is a duty officer in the FAA's Central Region.

PART FOUR

The Old Cap'n

by Richard D. Hague

From the outer office one morning, I heard the secretary's concerned voice. "Hold it, Sir... Sir... You can't just go barging in there.... Wait..."

My reverie thus disrupted, I rose to attend to the problem. The measured cadence of cavalry boots on carpet resonated through the FSDO. The thwack of a wobble pump handle against khaki jodhpurs. It had to be... I bolted for the back door.

A roar, garrulous and insistent. "Now hold on, Sonny, and sit yourself back down. I've only got a couple of minutes and..."

"'Scuse me, Cap'n, but last time you only had 'a couple of minutes', I had to send out for pizza at 1900."

"Boy," he thundered, "when's the last time somebody played the *1812 Overture* on your spinner with a wobble pump handle?" Having had the Old Cap'n explain it to me in terms that I could readily understand, I hastened to expunge the daylight between the seat of my pants and the seat of my chair.

"Now, Laddie, what's been going on? As long as I've been writing this article, I suspect that you've got the bird-brains grounded and the skies are safe. Am I right?"

"Ahhh," I stammered, "almost, Cap'n. Nothing that I probably can't attend to myself without taking up your valuable time."

"I'll be the judge of how to spend my time *and* yours, Squirt. Now, what's up?"

I dutifully handed over the newest batch of incident reports.

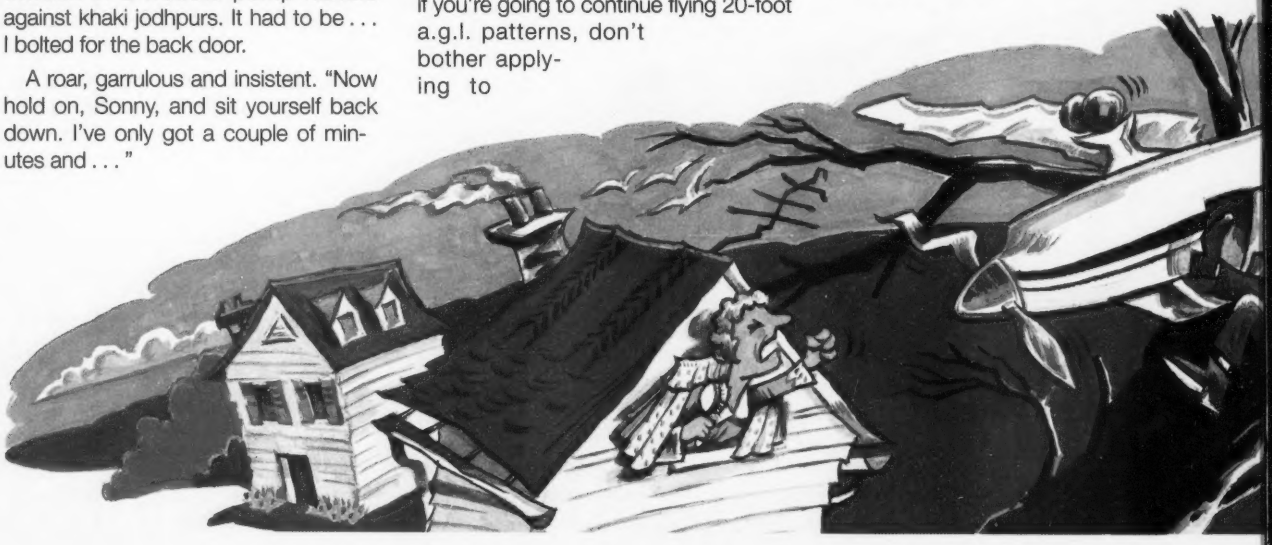
*During an approach to landing the aircraft flew through a 20-foot tree one-half mile from the point of intended l*anding. Aircraft landed inverted. No injuries.

"Dagnabbit! this clown is to aviation what Forrest Gump is to the mensa society. A twenty-foot tree a half a mile out? What was he in? A cessna or a submarine? Confidential to the gopher: if you're going to continue flying 20-foot a.g.l. patterns, don't bother applying to Penascola. you'd never get enough altitude to get aboard the ship.

"Quitcher gigglin' out there and listen up. **Keep the same sight picture on final approach every time you land.** A rock-solid, consistent approach will become important to you when you go for your Instrument Rating, because when you break out of the goop, you'll see the aiming point exactly where you expect to see it: at the terminus of a three-degree glide slope.

"Find yourself either a VASI or, if you're equipped, an electronic glide slope. Level at 1,500 feet above the touchdown zone altitude. Not 1,500 feet above the terrain that you're overflying; 1,500 feet above the point of intended touchdown on an airspeed that'll allow you to select approach flaps. (I recommend 1.4 VS_o.) Now *nail* the altitude. If you can fly at 1,550 feet, you can fly 1,500 feet. [Check the *Airport Facility Directory* or other published material for the airport's TPA, and refer to your POH for recommended approach and landing speeds which come close to 1.4 V_{so}. —*Editor*]

"It's no coincidence that, 99% of the time, you intercept VASI and ILS glide slopes at 1,500 feet above field elevation at five miles from touchdown. It coincides with the three-degree glide slope that you should be flying for all your approaches.



Superintendent of Documents Subscriptions Order Form

Order Processing Code:
*6654

Charge your order. It's easy!

Please enter my subscription for FAA AVIATION NEWS (FAN). One year $15.00 ($18.75 foreign). Two years $30.00 ($37.50 foreign).

The total cost of my order is $_____. Prices include regular domestic postage and handling and are subject to change.

Please Choose Method of Payment:

☐ Check Payable to the Superintendent of Documents

☐ GPO Deposit Account ☐☐☐☐☐☐☐ – ☐

☐ VISA or MasterCard Account

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

_____
(Company or personal name) (Please type or print)

_____
(Additional address/attention line)

_____
(Street address)

_____
(City, State, ZIP Code)

_____
(Credit card expiration date)

Thank you for your order!

_____
(Daytime phone including area code)

_____
(Signature)

11/93

Mail To: Superintendent of Documents, Government Printing Office, Washington, DC 20402–9371

DETACH ENVELOPE HERE ENCLOSE FORM WITH CHECK OR MONEY ORDER (Do not send cash)

PLACE
STAMP
HERE

Superintendent of Documents
Government Printing Office
Washington, DC 20402–9371

In fact, if you do it exactly like I tell you to, since ain't no better authority I can call to mind, you'll fly perfect approaches every time. And without a perfect approach, forget having a perfect landing. Can't be done.

"As you approach the glide slope, select the flaps recommended by your POH, check the rollers in the green, and complete the checklist. Set the power where it'll carry you at a normal sink rate reference the wind (try 500 feet per minute for openers), and get her pointed down hill headed for the barn. Light on the controls. Easy on the power. Tiny, smooth corrections. Your passengers will think you're a cross between Chuck Yeager and me. They're to be forgiven, by the way, if they've never heard of Yeager. Your scan is runway-airspeed-runway-airspeed . . . . A final GUMP check at 200 feet and Bingo! Bucko, you've got yourself a Stabilized Approach.

"Now, none of this sage advice from yours truly is going to be worth a beer belch in a blimp to that frustrated tree surgeon, but for the rest of you, if you want to play on the Old Cap'n's team (and who wouldn't?), you've got to be smooth, standard, steady and safe. Is it easy? 'Course not, or everyone would be doin' it. Does it take work? Lots. Is it worth the effort? Ask yourself the question: did you work hard to get where you are professionally? Study some, did you? Practice? Think-eat-drink-sleep your job in order to be the best you can be? Well, Sprout, approach your flying in the same way. So you're not a professional pilot. Don't make a bit of difference. Look at the word *amateur*. "Ama . . . " "For the *love* of it . . . " If you love flying, do it right. Every time."

"Sad to say, Cap'n, you can't pick up a newspaper without seeing where someone's hit a wire or poked a wing tip into somebody's alfalfa field, so I think a word or two from you might be appropriate. There are still folks that hedge-hop, buzz, flat-hat, whatever you call it."

"I call it gold-plated stupid, but No! by George. I'm not going to do it. I mean, this is like telling a guy in baggy pants not to forget his suspenders afore goin' to a polka party. Telling a real pilot not to get close to the ground unless there's a number and a center line stripe under the wheels is like having to tell an apprentice lion tamer to remember his industrial strength Fruit-of-the-Looms before going to work. It makes me madder than a house cat in a horse trough to think that there are still fools out there that show such utter contempt for themselves, their airplanes, the property of others and their passengers as to operate that close to the edge. Makes me pine for the good old days of public hangings. So, I'll talk about buzzing, not to the nut case behind the stick, but to his passengers.

"Folks, if you permit this kind of activity when your very own favorite fanny is strapped to the same piece of aluminum that's under the dubious command of Buzz-The-Scuzz, I'm telling you to find a mode of transportation that's being managed by someone other than a leaky-nosed, egotistical fool with a buffalo chip for a brain. That kind of flying ranks in intelligence right up there with volunteering to be a wing walker on the space shuttle, creative hand-propping, and airborne thunderstorm research in an ultra-light.

"Next time you are tempted to fly with Buzz-The-Scuzz, ask yourself, "at what distance can you see a wire? How far will you fly from the time that you identify the wire, alert Buzz-The-Scuzz, wait for his reaction, and feel the aircraft start to climb? How well is Buzz-The-Scuzz prepared to cope with an engine failure at low altitude? Does Buzz-the-Scuzz know your exact position at all times? The heights and locations of all obstructions on the proposed route of flight? *You'd* better, because Buzz-The-Scuzz hasn't got a clue.

"Were you fully briefed by Buzz-the-Scuzz of his intentions? And did you give him your permission to expose you to an unnecessary, unacceptable level of danger?"

Knowing that the Old Cap'n has a low tolerance for stupidity in aviation, I saw that his vehemence had raised the humidity in the FSDO. I excused myself to get a towel with which to wipe my computer screen. When I returned, the Old Cap'n was gone, but under the fog on the screen were the words,

"Keep the blue side up, Kiddo. See you next time." ■

STATUS OF THE FAR

It is important to keep in mind that the Federal Aviation Regulations (FAR) are amended often in some cases, and existing provisions in your copy may be nullified or changed by this process unless it is updated continuously. Many of the FAR are reprinted commercially, some in book form. However, commercial publications may or may not provide updates. In an effort to keep our readers up-to-date on the latest FAR changes, the *FAA Aviation News* periodically publishes their status.

The FAR are sold in two ways by the Superintendent of Documents—subscription and single sales. When you order a subscription, for which there is an annual charge, the changes will be sent to you automatically as they are issued. Single sales are a different matter. The changes to these parts are infrequent, and no direct notice of a change is sent out. Therefore, you must order and pay for each change as it is issued.

Another way of obtaining the FAR is to purchase the bound volumes of the U.S. Code of Federal Regulations. Three volumes of Title 14 contain the Federal Aviation Regulations:

Parts	1–59 (SN 869–017–00042–6)	$25.00
Parts	60–139 (SN 869–017–00043–4)	$22.00
Parts	140–199 (SN 869–017–00044–2)	$11.00

These volumes are only updated annually, so the latest changes would have to be obtained from another source.

The following pages contain the current status and price list for the loose-leaf FAR. Color highlighting indicates those rules considered of special interest to general aviation pilots.

To order any of the FAR parts, send check, money order, or credit card number to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325. Add a 25% charge for foreign mailing on the single sale items. Remember to use the stock number.

Parts Sold on Subscription Service

Part	Title	Code Letter	Price Domestic	Price Foreign	Changes Issued
1	Definitions and Abbreviations	FA001	36.00	45.00	—
11	General Rule-making Procedures	FA011	30.00	37.00	1
13	Investigative and Enforcement Procedures	FA013	22.00	29.50	1
21	Certification Procedures for Products and Parts	FA021	38.00	47.50	—
23	Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes	FA023	36.00	45.00	2
25	Airworthiness Standards: Transport Category Airplanes	FA025	32.00	40.00	4
27	Airworthiness Standards: Normal Category Rotorcraft	FA027	39.00	48.75	2
29	Airworthiness Standards: Transport Category Rotorcraft	FA029	28.00	35.00	3
33	Airworthiness Standards: Aircraft Engines	FA033	27.00	33.75	—
36	Noise Standards: Aircraft Type and Airworthiness Certification	FA036	26.00	32.50	—
43	Maintenance, Preventive Maintenance, Rebuilding, and Alterations	FA043	32.00	40.00	1
45	Identification and Registration Marking	FA045	33.00	41.25	—
61	Certification: Pilots and Flight Instructors	FA061	38.00	47.50	4
65	Certification: Airmen Other Than Flight Crewmembers	FA065	36.00	45.00	2
71	Designation of Federal Airways, Area Low Routes Controlled Airspace, and Routes, Reporting Points, Jet and Area High Routes	FA071	29.00	36.25	5
91	General Operating and Flight Rules	FA091	47.00	58.25	10
	*Preamble		*free		

Parts Sold on Subscription Service

Part	Title	Code Letter	Price Domestic	Price Foreign	Changes Issued
93	Special Air Traffic Rules and Airport Traffic Patterns	FA093	36.00	45.00	5
103	Ultralight Vehicles	FA103	12.00	15.00	—
121	Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft	FA121	60.00	75.00	7
125	Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More	FA125	25.00	31.25	4
127	Certification and Operations of Scheduled Air Carriers With Helicopters	FA127	35.00	43.75	1
129	Operations: Foreign Air Carriers and Foreign Operators of U.S.-Registered Aircraft Engaged in Common Carriage	FA129	26.00	32.50	—
135	Air Taxi Operators and Commercial Operators	FA135	45.00	56.25	4
137	Agricultural Aircraft Operations	FA137	12.00	15.00	1
139	Certification and Operations: Land Airports Serving Certain Air Carriers	FA139	29.00	36.25	1
145	Repair Stations	FA145	34.00	42.50	1
150	Airport Noise Compatibility Planning	FA150	22.00	27.50	—
159	National Capital Airports	FA159	17.00	21.25	—
161	Notice and Approval of Airport Noise and Access Restrictions	FA161	29.00	36.25	—

*Not included with subscription. For a particular FAR Part 91 preamble, write to DOT, M–443.2, Washington, DC 20590.

Parts Sold on Single Sale Basis

Part	Title	Price[1]
31	Airworthiness Standards: Manned Free Balloons (SN 050–007–01020–6)	5.50
34	Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes (SN 050–007–00883–0)	1.00
35	Airworthiness Standards: Propellers (SN 050–007–01016–8)	6.00
39	Airworthiness Directives[2] (SN 050–007–00229–7)	1.75
47	Aircraft Registration (SN 050–007–01047–8)	4.25
49	Recording of Aircraft Titles and Security Documents (SN 050–007–01021–4)	2.75
63	Certification: Flight Crew members Other Than Pilots (SN 050–007–01051–6)	13.00
67	Medical Standards and Certification (SN 050–007–00999–2) Change 1 (being prepared)	3.50
73	Special Use Airspace[3] (SN 050–007–01007–9)	2.00
	Change 1 (SN 050–007–01035–4)	1.25
77	Objects Affecting Navigable Airspace (SN 050–007–00978–0)	2.75
95	IFR Altitudes (SN 050–007–00277–7)	1.75
	Change 1 (SN 050–007–00285–8)	1.75
97	Standard Instrument Approach Procedures[4] (SN 050–007–01002–8)	1.75
99	Security Control of Air Traffic (SN 050–007–01022–2)	4.00
101	Moored Balloons, Kites, Unmanned Rockets, and Unmanned Free Balloons (SN 050–007–00964–0) Change 1 (being prepared)	3.25
105	Parachute Jumping (SN 050–007–00965–8)	4.25
107	Airport Security (SN 050–007–01017–6)	5.00
108	Airplane Operator Security (SN 050–007–01049–4)	6.50
109	Indirect Air Carrier Security (SN 050–007–00512–1)	1.75
	Change 1 (SN 050–007–00856–2)	1.00
133	Rotorcraft External-load Operations (SN 050–007–00998–4)	5.50
141	Pilot Schools (SN 050–007–00322–6)	3.50
143	Ground Instructors (SN 050–007–00249–1)	3.00

Parts Sold on Single Sale Basis

Part	Title	Price[1]
147	Aviation Maintenance Technician Schools (SN 050–007–00975–5)	3.75
151	Federal Aid to Airports (SN 050–007–00261–1)	5.00
152	Airport Aid Program (SN 050–007–01048–6)	6.00
155	Release of Airport Property from Surplus Property Disposal Restrictions (SN 050–007–00270–0)	1.75
	Change 1 (SN 050–007–00550–4)	1.75
157	Notice of Construction, Alteration, Activation, and Deactivation of Airports (SN 050–007–010223–1)	2.25
158	Passenger Facility Charges (SN 050–007–00906–2)	1.25
169	Expenditure of Federal Funds for Non-Military Airports or Air Navigation Facilities Thereon (SN 050–007–00280–7)	2.25
	Change 1 (SN 050–007–00851–1)	1.00
170	Establishment and Discontinuance Criteria for Airport Traffic Control Services and Navigational Facilities (SN 050–007–00892–9)	1.25
171	Non-Federal Navigation Facilities (SN 050–007–00967–4)	9.00
183	Representatives of the Administrator (SN 050–007–01057–5)	2.50
185	Testimony by Employees and Production of Records in Legal Proceedings and Service of Legal Process and Pleadings (SN 050–007–00237–8)	1.75
	Change 1 (SN 050–007–00859–7)	1.00
187	Fees (SN 050–007–00234–3)	2.75
	Change 1 (SN 050–007–00618–7)	2.75
189	Use of Federal Aviation Administration Communication System (SN 050–007–00235–1)	2.75
	Change 1 (SN 050–007–00867–8)	1.00
191	Withholding Securit Information From Disclosure Under the Air Transportation Security Act of 1974 (SN 050–007–00359–5)	1.75
	Change 1 (SN 050–007–00502–4)	1.75
	Change 2 (SN 050–007–00857–1)	1.00

[1] Add 25% for foreign handling.

[2] Due to their length, complexity, and frequency of issuance, individual Airworthiness Directives (AD's) are published separately in the Federal Register. Microfiche or paper copies of the AD's in summary form are sold by DOT/FAA for the Superintendent of Documents. Ordering information is in Advisory Circular 39–6P, "Announcement of Availability—Summary of Airworthiness Directives," (free from DOT, M–443.2, Washington, DC 20590).

[3] Due to their length, complexity, and frequency of issuance, individual airspace designations, airways descriptions, restricted areas, jet route descriptions, and IFR altitudes are not included in the publication of these basic Parts. Such descriptions are published in the Federal Register and depicted on appropriate aeronautical charts. Aeronautical charts can be obtained from the NOS, NOAA, Distribution Branch, N/CG33, Riverdale, MD 20737–1199.

[4] Standard Instrument Approach Procedures are published in the Federal Register by reference to FAA documents which are available for examiniation in the Rules Docket (AGC–204) and the National Flight Data Center, FAA Headquarters, Washington, DC, and at the appropriate FAA regional offices and Flight Inspection District Offices. These Instrument Approach Procedures Charts can be obtained from the NOS, NOAA, Distribution Branch, N/CG33, Riverdale, MD 20737–1199.

T.B.O.

Should You Oughta? Do you Gotta?

by Bruce Edsten

TBO Haul the old Funk and Wagnalls down off the shelf and look it up, and you'll get no help at all. I don't think any really official definition exists, but it is generally accepted as the abbreviation for Time Before Overhaul. Some say "Between", should say "Beyond", etc. Well, you get the idea. How long will this thing run: That's the question!

Generally, we tend to associate a TBO figure with engines, but lots of other components get numbers hung on them too, such as props, alternators, vacuum pumps, and such. Ok, we got a number. So what? Where do the numbers come from? What do we have to do about it?

Mean Time Before Failure

Time was, an engine manufacturer would run a bunch of engines until they blew, average the times, and thereby establish an MTBF or Mean Time Before Failure for the unit. Of course, everybody knows these were hand built examples, not "run of the mill" units, so a generous "fudge factor" was applied. Up to half the MTBF was knocked off, and a reasonable TBO was established. As more experience was gained with a particular unit, the TBO might be increased, and this experience could then be applied to different but similar new units. That's pretty much where we are today. The body of past history for engines and accessories, plus some computer simulations and engineering guesses are used to establish today's TBO's, but the number, arrived at by whatever method, is anything but sacred.

All you have to do to see *that* is go out in the field for a while and ask questions about something like a particular engine. The first guy says: "Worst piece of @#*!@#*!@<# I ever saw! The one in my Pooper Chairhockey never made it to a *quarter* of the TBO! Cost me plenty-two thousand to overhaul it, too!" Next guy says: "Yup, got one of them in my Bellcranker and I been running it since '74. Got more 'n 4,000 hours on it without a peep out of it." Well, hardly a significant statistical sampling! Looking at the broader picture, though, you will find that *most* engines, props, etc. make it to the TBO.

Where do the differences come in? First of all, these are fallible devices, designed and built by fallible humans. They are then operated and maintained by another batch of fallible humans! Because of all these fingers in the pie, "Stuff" happens! Ever screw in a brand-new light bulb and have it blow the first time you turn it on? Me, too! I also have one in my basement that's corroded into the fixture. Been there for *years*! You figure!

Use and Maintenance

Probably most important, though, is use and maintenance. Engines that sit don't last. Water and acids are natural products of combustion, and if allowed to accumulate in the engine, will eventually corrode the interior workings. However, if the engine is brought up to full operating temperature on a regular, frequent basis, the water will evaporate out. This means a flight of an hour or so at least a couple times a week.

Oil changes are cheap insurance, and the less the engine is used, the *more frequent* the oil changes should be. Sounds silly, but it's not! Fifty hours is probably soon enough for an active aircraft, but if it just *sits*, the oil should come out sooner, like at 25 hours. Why? Acids! If the oil has been in there for more than 3 months, it should come out anyhow, and if the engine has less than 25 hours on it that 3 month time period, it's in trouble in any case! Basically, if you rest, you *rust*!

A perfect case in point was the Cherokee Flightlines I flew some years ago as a Flight Instructor. Purchased new, we had operated it for about two years, and had put about 2,300 hours on the 2,000 TBO engine. One day my student had left to go solo in the practice area, but was back in about 10 minutes with a 400-RPM drop on both mags. A few quick checks indicated that some serious time was required to fix the problem, so off went the bird to maintenance.

Now having three identical Flightliners, and all of them getting to be high time, management decided that having a spare engine was a good idea. So a

factory new O-320 was already hanging from an engine stand. Since this machine was already 15% past TBO, the decision was made to just yank the engine and throw in the new one. During the installation of the new engine, it was discovered that the only problem with the old one was a partially plugged muffler! On teardown, every single part of the old engine was found to meet new part specifications! That means they could have put it all back together and called it an overhaul, without a single new part!

They did put a new bearings and such, but that's not the point. That engine could have run a lot longer, and the reason it passed TBO with no problems is because it was *used* daily, kept clean, and had the oil, filter, and spark plugs pulled on a regular basis. Since then, I have heard of several O-320's that have gone to more than 3,000 hours before needing any serious attention.

Attention to TBO

Clearly, we were not paying much attention to TBO, and that's O.K. in most cases. Even though this was an Approved (Part 141) Flight School, there was no requirement to observe the TBO, and *you* probably don't have to either. Of course, this does not mean you can simply run forever, but, as mentioned above, proper use and maintenance can go a long way toward SAFELY allowing you to exceed the numbers.

About the only folks who are stuck with TBO's as absolute limits are the air carriers, but even then it is, shall we say, negotiable. If a particular Operator's experience warrants it, they may be allowed to extend the overhaul period, but this almost always requires the Operator to have special training and tools for its maintenance personnel. As a rule, this extension will also be for this Operator only.

Airworthiness Directives (AD's), sometimes known as "AD notes", are a different matter altogether, and must be complied with in the appropriate time period no matter what. In many cases, the affected unit has to be looked at one the occasion of the next annual, or perhaps within the next 50 or 100 hours of operation. In some rare cases, it's gotta come off RIGHT NOW! All this may or may not affect the TBO, but whether it does or not, this kind of time period *MUST* be observed!

Fear of Not Overhauling

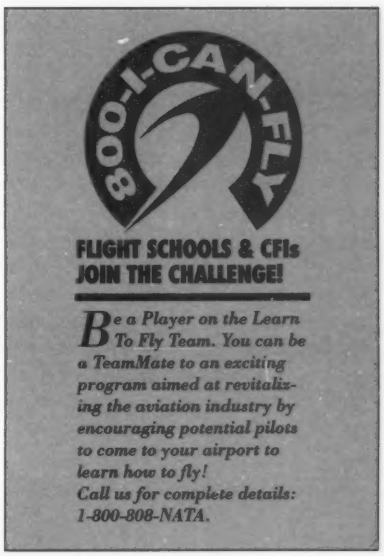
With reasonable or better attention to detail your coffee grinder ought to get to or beyond the magic number, but how does this work in the real world? According to a survey of several engine rebuilders, most engines that go to the overhaul shop didn't need to go. These units are typically right at or slightly past the recommended TBO, but upon inspection at teardown are found to be in fine shape. Then why do the owners plunk down ten or fifteen or more big ones (Really big ones!) for an overhaul they really didn't need? Fear.

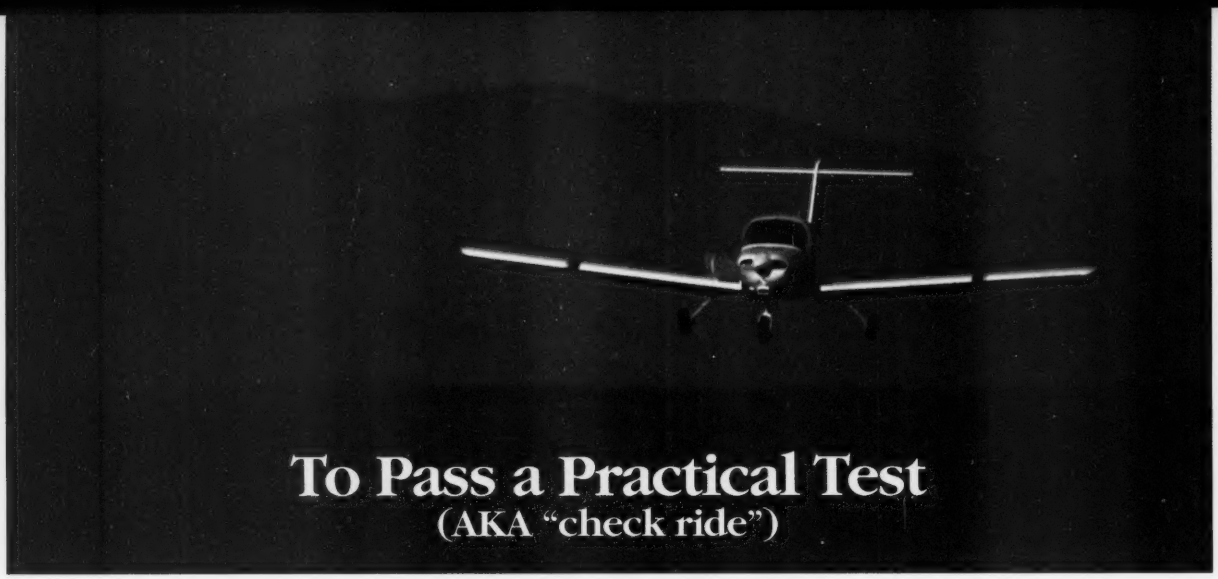
Fear of lawyers (Fully justified) and fear of insurance adjusters and "the fine print" (Less justified). We know all too well about the lawyer who will jump on the tiniest thing and make a Federal case out of it. More than a few folks figure that if they wrinkled the airplane and it was discovered that they were past TBO, somebody would leak that information, and they'd be hung. (Even if the wrinkle had nothing to do with the engine.) So far, there aren't any cases that indicate that's true, but you never know.

To the best of my knowledge, the insurance companies aren't looking at the TBO as a limit either. As long as an appropriately rated mechanic as signed everything off as airworthy, that should be the final word regarding airworthiness, TBO or no. Better check your policy, though!

So, the TBO is a reasonable average figure, but it's neither an absolute limit nor a guarantee. There are many variables that ultimately determine whether your engine, propeller, or whatever will actually make it to or beyond TBO! ■

Editor's Note: This article is reprinted from the FAA's Louisville, KY, Flight Standards District Office's Safety Prevention Program Newsletter edited by Bruce Edsten, the office's Safety Program Manager.


800-I-CAN-FLY
FLIGHT SCHOOLS & CFIs
JOIN THE CHALLENGE!
Be a Player on the Learn To Fly Team. You can be a TeamMate to an exciting program aimed at revitalizing the aviation industry by encouraging potential pilots to come to your airport to learn how to fly!
Call us for complete details:
1-800-808-NATA.



To Pass a Practical Test
(AKA "check ride")

by Thomas N. Jones

Stress is a significant factor in nearly every practical test. The airman taking the test has every right to be concerned about whether or not he or she will pass the practical test and obtain the coveted rating, a position with a prospective employer, or a job flying for an air carrier.

Veteran pilots are subject to the same stress as the beginning pilot. Sometimes more experienced pilots have more at risk and feel even greater stress. If a veteran pilot fails a practical test, it may mean loss of employment and loss of "face" with fellow pilots. The consequences of failure may have devastating results.

As an aviation safety inspector, the majority of tests I administer are for initial flight instructor applicants. Many of the applicants who come to our office, and other offices around the country, are not prepared to take the practical test they have been recommended for.

Preparation is obviously the key to passing a practical test on the first attempt—or the forty-fifth! The big question is, "How do I prepare?"

I am often drawn aside at safety seminars by CFI "wannabes." They usually tell me that they are preparing for the CFI practical test and want to know what advice I can give them to help prepare for this momentous event. After I give pointers for about five minutes, the applicant's eyes usually glaze over, and I know that I am no longer communicating with this individual. They do not want to hear about all the effort and preparation that goes into earning a rating. It's work!

When I earned my CFI rating, we did not have the Practical Test Standards (PTS). We used "Flight Test Guides." The flight test guides were better than nothing, but the PTS is a gigantic improvement. Contained in this valuable document is the recommending instructor's responsibility, the examiner's responsibility, and what the passing and failing criteria are.

The introduction to the PTS outlines the various responsibilities and the material required for preparation and for the test. The introduction is usually overlooked, at least by the applicants that our office sees. I usually ask CFI applicants for the definition of "instructional knowledge." This term appears 137 times in the CFI PTS, so I feel that anyone coming to take the initial CFI test should know what that means—many applicants do not!

The recommending flight instructor is "responsible for training the applicant to acceptable standards in all subject matter areas, procedures, and maneuvers included within the TASKS within the appropriate practical test standard," according to every PTS. If the CFI trains to that standard, the applicant will pass the practical test with no problem.

I recommend that after a CFI thinks an individual is ready for the practical test, he or she ask another CFI to administer a "mock" check ride to the applicant. If the applicant cannot pass the practical test given by another CFI, he or she stands little chance to pass a practical test administered by an FAA inspector or a designated pilot examiner.

If the applicant thinks this is excessive, compute the cost of taking the mock check ride versus the cost of taking the actual check ride and failing. Such costs as flying to the FSDO, or the examiner, plus the examiner's fee, and the possibility of an additional fee for a failed practical test should be factored. If the applicant has demonstrated to one CFI that they are ready to take the practical test and then taken a mock check ride with another conscientious CFI, the applicant should have less apprehension about the test with the examiner or inspector. If nothing else, it will give the applicant another CFI's opinion of their readiness.

One piece of advice I give to all CFI applicants is to use a tape recorder to record themselves giving flight lessons while sitting on the ground in a quiet room. Then, I tell them to listen to what they've said. The applicant will get a better idea of how they sound and exactly what they are saying. Using a a camcorder and VCR is another good idea, but a tape recorder works just as well and can be purchased for less than $30 at various stores.

The recommending instructor is charged with instructing the applicant

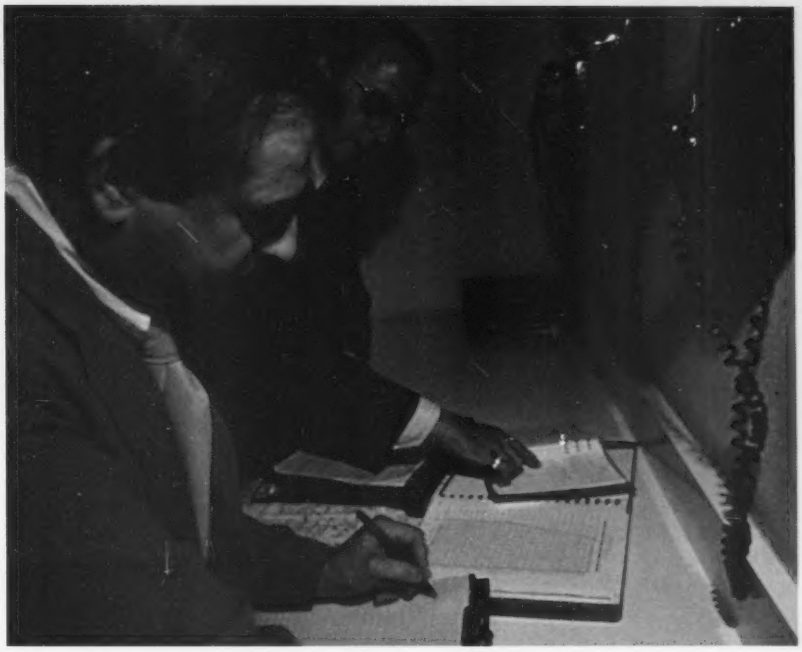
in all tasks. Because of the expense of charging for ground school, many applicants tell their instructors that they are already familiar with the tasks. After all, they just received their commercial pilot certificates, didn't they? They should know all about the subject matter. Wrong!

The applicant must show instructional knowledge of the subject. Instructional knowledge is a great deal more involved than the knowledge required by a commercial pilot. Instructional knowledge is a greater requirement than even that required for an airline transport pilot certificate. The ATP only has to know the systems, not teach them!

Another way to reduce stress on the day of the practical test is for the recommending CFI to log all ground school given to the applicant. Many applicants who appear at our office have NO record of ground instruction received, just flight instruction. After all flying is the exciting part, not all that boring ground stuff. We hear so often, "I can fly the airplane with no problem." Unfortunately, that is not the whole evaluation criteria. An oral examination must be conducted first, and if a person doesn't demonstrate instructional knowledge during the oral, the practical test will have to be put off until he or she acquires it.

The recommending CFI should make sure the applicant has all the material required in the PTS and that the applicant has instructional knowledge of the maintenance records of the aircraft to be taken to the practical test. If the recommending CFI is not sure what the applicant should do about logbooks, etc., hire an A&P with an inspection authorization to go over the paperwork with the applicant. Many applicants show up to take a practical test with an aircraft this is not airworthy. This shows a lack of interest on the part of the recommending CFI and a lack of knowledge on the part of the applicant.

If you are reading this article as a prospective CFI applicant, do not accept less than excellent instruction for your certificate. Seek out a CFI who has been successful in sending CFI applicants who have come home CFI's on the first try. Do not begrudge paying for ground school. That is the most important part of the flight training. If you are preparing for a rating other than CFI, the same holds true. If you do not have the knowledge to pass the oral portion of the practical test, you will not get to take the flying part of it, either.



Applicants have to acknowledge that their CFI must be the authority on whether or not they are ready for a certificate, rating, or a written exam. If a CFI is pushed into recommending an applicant who is not ready, that CFI is NOT demonstrating professionalism.

Another major problem is with endorsements. It does not take a lot of imagination to endorse an applicant's logbook properly. The FAA has generously provided guidance for endorsements in the form of Advisory Circular (AC) 61-65C, "Certification: Pilots and Flight Instructors." All endorsements that are required are in this advisory. If an instructor has something else that he or she needs to recommend that is not in the AC, call your local FSDO and ask. Do not embarrass your applicant by sending him or her in for a rating without the proper endorsements. The FAR, the PTS, and AC 61-65C give requirements for various ratings. Be sure your applicants have met all the requirements and have all the endorsements.

Proper preparation is the key to passing practical tests on the first try and also to reducing apprehension about the test. I know from personal experience that whenever I feel I am ready for a check ride, I have far less apprehension and feel far less stress.

Be willing to obtain the required training and to put in the necessary effort. It will be well worth it when you walk away from your practical test with a temporary certificate and feel that you have honestly earned your place within the ranks of your fellow aviators. It is a wonderful sense of accomplishment to obtain a pilot rating, especially on the first attempt.

All CFI's should remember how they felt whenever they went for a practical test. Do whatever you can to reduce the amount of stress your applicants experience at the thought of an impending practical test. ■

Mr. Jones is the Safety Program Manager at the FAA's Flight Standards District Office in Winston-Salem, NC.

The A,B,C's of Airspace Operations for Ultralights

by Ellen Crum

Attention Ultralight drivers! How long has it been since you cracked open the Federal Aviation Regulations (FAR)? Part 103 of the FAR addresses certification, inspection, and general operating rules for ultralight vehicles, including the airspace where ultralight vehicles may operate. In 1993 the United States reclassified its airspace, which in part changed the name of most airspace areas. For example, Airport Traffic Areas have been renamed Class D airspace areas, and Airport Radar Service Areas are now Class C airspace areas. Portions of Part 103 of the FAR have been amended to reflect the new names; however, operations and procedures pertaining to ultralight vehicles have not been altered.

Section 103.17 of the FAR states, "No person may operate an ultralight vehicle within Class A, Class B, Class C, or Class D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport unless that person has prior authorization from the air traffic control facility having jurisdiction over that airspace." Recently, the FAA has become aware that some misinformation regarding operations within Class E surface areas may have been disseminated. The question is, when may an ultralight vehicle operate within a Class E surface area? And since we brought it up, what is a Class E surface area anyway? In accordance with the *Airman's Information Manual*, a Class E surface area is airspace configured to contain all instrument approaches to the associated airport and is depicted on sectional aeronautical charts with a magenta segmented line (previously known to most of us as a control zone). The airspace extends from the surface up to the altitude specified on the chart. FAR 103 does not require two-way radio communications for ultralights, only prior ATC authorization to operate an ultralight within the area. The existence of the surface area is independent of weather conditions.

But what about the Class E airspace that is not associated with a surface area? In fact, the majority of Class E airspace areas are not associated with surface areas, and ATC authorization is not required for ultralight vehicle operations. However, rules pertaining to flight visibility and cloud clearance requirements, daylight operations, right-of-way rules, and operations over congested areas still apply.

This rule differs with rules that are applicable to aircraft operations in the same airspace. So what is the difference? An aircraft operating under VFR is not required to establish two-way radio communications in a Class E surface area provided the primary airport of the surface area is reporting VFR weather conditions. In VFR conditions, neither an aircraft nor an uitralight vehicle is required to establish two-way radio communications with ATC. However, an ultralight vehicle operator, regardless of weather, must obtain approval from the ATC facility having jurisdiction over the airspace prior to entering. Is approval from a fixed-base operator, or airport management, to operate an ultralight vehicle at an airport within a surface area the same thing as ATC authorization? No! The FAA alone has control authority for operations within U. S. airspace and is the sole authority to grant approval for ultralight operations within specified airspace.

Why does the FAA require ultralight operators to obtain authorization prior to operating in a Class E surface airspace area? Safety! Safety! Safety! Surface areas contain instrument approaches. Aircraft who execute instrument approaches are afforded increased protection from other aircraft (or ultralight vehicles) when the intentions of surrounding aircraft are known to ATC. REMEMBER: This procedure has been in effect since the promulgation of FAR Part 103. Airspace reclassification changed some names, but not the rules!

How do I obtain ATC authorization if I wish to fly my ultralight vehicle in a Class E surface area? First, determine the ATC facility which has jurisdiction over the area. Generally, a call or letter to the local flight service station or en route facility can direct you to the appropriate ATC facility. The telephone numbers and addresses are listed in

the phone book under Department of Transportation, Federal Aviation Administration. Each facility establishes its own procedures for granting authorization; however, be prepared to give your name, address, home base, time of flight, route, altitude, and a description of the vehicle. Depending on local traffic needs, you may be asked to proceed through the area at a predetermined time, route, or altitude. If you have a radio, let them know so you can be issued the appropriate radio frequency. Most facilities prefer at least a 24 hour notification, so don't leave this task to the last minute. And please note; administrative staff is generally not available on weekends, so the likelihood of a request being processed on a weekend or holiday is minimal.

Weather or some other unforeseen event may take you through a Class E surface area. May ATC authorization to operate within a Class E surface area be obtained on a handheld radio while airborne? Yes, but it is not expected that authorization would be issued to airborne ultralights on a routine basis. Most facilities prefer that you use the telephone. stop by for a visit, or make your request in writing. Though this may take a little extra effort and planning, the end result is enhanced safety for you and other airspace users.

Finally, when was the last time you visited an air traffic control facility? Make an appointment, and arrange to stay for several hours. No two facilities are alike. Each air traffic facility is delegated specific airspace in which to control air traffic and often have established operating procedures uniquely their own! If you operate close to a major terminal area, find out the location of arrival and departure routes. Ask the controllers to point out routes for you to use that will insure clearance from these heavily congested routes. Ask the controllers to indicate on the radar scope the airspace where you normally operate, and observe other airports, obstructions, and traffic flow in that area. You will be pleasantly surprised at all you can learn by taking the time to visit an ATC facility, and who knows, it is quite possible for you to teach the controllers a thing or two about operating ultralights! ■

Ms. Crum is a specialist in the FAA's Air Traffic Rules Branch, an instrument-rated private pilot, and "proud owner of a Mooney!!"

MedicalSTUFF

To Fly or Not...

by Patricia Mattison

It's morning. All of the signs are there. The alarm has gone off, sounding somewhat like a cannon in the 1812 Overture. Ready or not, it's time to start another flying day.

The struggle to open your eyes is made even worse by the fact that your head, feeling as if it weighs 50 pounds, refuses to leave the pillow. After pleading with yourself to get up and brush your teeth you look to face "The Creature from the Village of the Damned" staring back at you from the mirror. A day in the life of a pilot who has a sinus cold fit to kill has begun. To fly or not . . .

This particular pilot, has decided to fly anyway. He has a trip that will take him over high terrain and perhaps into instrument conditions along his route. Has he taken this into consideration? Let's catch up with him and see.

He arrived at the airport to see the eager, shining faces of his passengers awaiting their flight. After a preflight of the airplane and a check of the weather en route, he filed his flight plan. As soon as he received his weather briefing, he knew that he would encounter instrument meteorological conditions immediately after he departed the airport.

After departure and climb out, he leveled at his assigned altitude, only to find himself in a steep, left turn. His inner ear told him he was level, but the instruments told him otherwise. He could hear his phantom flight instructor yelling, "Rely on your instruments!" Riveting his eyes on the panel, his trusty instruments came to his rescue, and he regained straight and level flight.

Suddenly, the weather cleared, and the plane flew on through blue skies. Our pilot got a new altitude of 10,000 ft., and the rest of the trip was uneventful—until the controller said, "Hummingbird 47 Romeo, descend and maintain 6,000 ft. Expedite your descent to 6,000 for traffic."

Okay, here we go. The descent began at 1,000 feet per minute, and it is painful. Through 9,000, 8,000, 7,000—holy mackerel, the pain is awful. It feels as if a crowbar has penetrated his whole upper jaw. His right ear is telling him to "Climb, stupid," and the passengers are asking if they'll arrive on time.

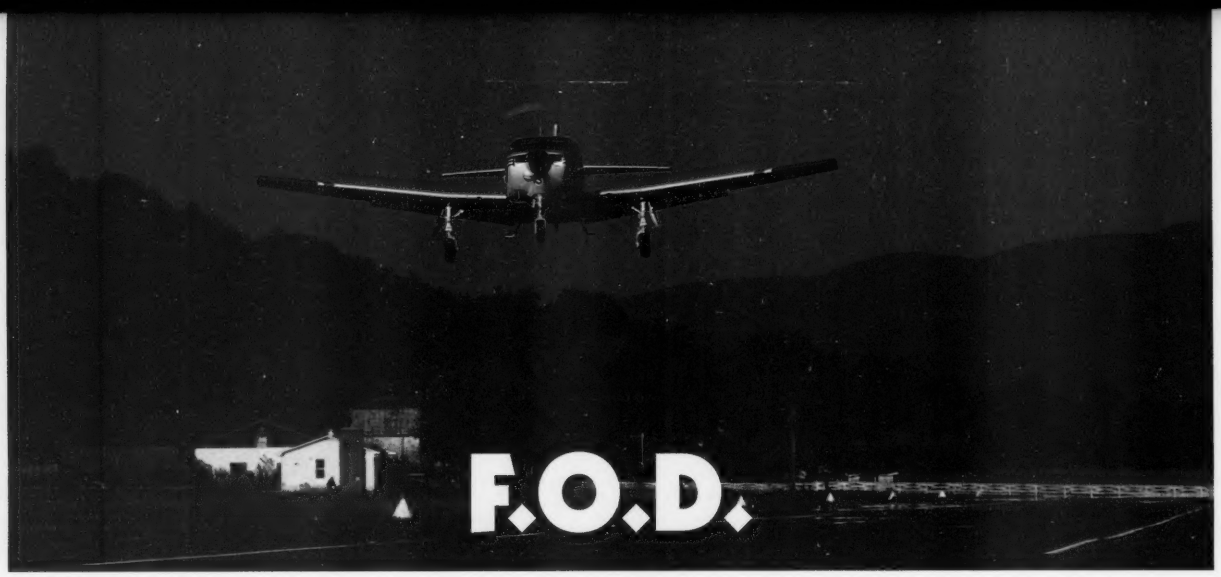
Center comes on with the blessed words, "Hummingbird 47 Romeo, maintain 6,000." For an exquisite four minutes, his ears equalize, the pain subsides, relief.

When control came on with his next altitude assignment, the pilot asked for a slow letdown to spare his ears, and the descent from 6,000 went at a much slower rate.

The moral to this story is that the pilot should have stayed home in the first place. A lack of balance because of his inner ear blockage could have caused him to lose control of his airplane. Lack of concentration flying instruments in poor weather could have resulted in an accident.

Pilots spent a great deal of time in preparation for a flight. Preflight of the aircraft, weather briefings, flight plans, and navigation all go together to make that flight successful. But how often do we give ourselves a preflight evaluation?

Try it next time. It could save a lot of pain and maybe some grief. ■



F.O.D.

by Bruce Edsten

FOD actually stands for "Foreign Object Damage," but we generally use the term to mean anything floating around loose that could come in contact with an airplane and damage it or interfere with the safe operation of it. This stuff can be just about anything you could think of and can come in all different sizes and shapes.

The big jets fare the worst, of course, because they can suck up all kinds of things (even PEOPLE!), and even the smallest of these things can wreak havoc with a turbine engine. Because of this, considerable time and effort goes into cleaning up the areas where the turbine types operate. At many major airports, there are crews that do nothing but sweep the ramps, taxiways, and runways with huge machines. This is all very expensive but well worth the expense when you consider that a single bolt an inch long and half an inch in diameter can completely destroy a multi-million dollar turbojet engine in seconds.

Of course, most of us are not shepherding the giant Kerosene Queens around, but that doesn't mean FOD isn't a problem for us. Most light planes have their propeller tips only a few inches from the ground, even on some pretty good sized twins. As air is sucked in and blown back by a propeller, a "mini-tornado" is formed directly under propeller arc. This "tornado" will pick up all manner of stuff, and, regardless of what it is, it WILL cause SOME damage to the propeller blades!

Even water is damaging to props. You can HEAR it being picked up when you taxi through even the shallowest of puddles, right? And, if you still don't think water can hurt the prop blades, just ask the seaplane pilots! Remember, that prop tip is traveling a few HUNDRED miles an hour. Have you ever misjudged a dive into the pool and done a "belly flop?" Smarts, doesn't it? Imagine that at ten times the speed! In addition to messing up your prop, FOD can also clog up induction and cooling air paths. Dust, sand, mud, freshly cut grass, and any other loose stuff should be avoided at all costs. If you have to operate around this stuff, be sure to check the affected parts of the plane frequently. Cleaning out a partially blocked oil cooler or carb air filter can save a bunch of money in maintenance bills and might even prevent an accident.

Most of the FOD problems can be avoided through careful attention to where you taxi and by only running the engine at high power settings in CLEAN areas. If there aren't any clean areas around, it might be time to have a little heart-to-heart talk with the airport operator. It might even be necessary to organize some of the local pilots into a clean-up crew and go MAKE a safe run-up area.

FOD is found INSIDE the airplane as well. Accident reports abound with tales of broken seats, short circuits, jammed controls and the like, all because of something coming loose and going where it wasn't supposed to go.

Some years ago, I had occasion to watch a VERY interesting landing, where the pilot bounced his *Aeronca Chief* on the first landing attempt. The bounce caused his portable radio to fall off the seat beside him and go behind the right side rudder pedals. This somewhat limited his directional control, as you might imagine. As the airplane started for the weeds, he added full power, maintaining directional control with the remaining rudder and a bunch of right bank. Not coordinated but it worked, and he climbed back to a safe altitude and dislodged the radio. After allowing the adrenaline level to get somewhere near normal, he came back for a safe (if somewhat shaky) landing.

You can bet he won't pile any loose stuff on the seat again. Before takeoff, you should be sure that everything in the plane is properly stashed and secured: A place for everything, and everything in its place!

Basically, if there is anything lying around loose, either inside or outside the airplane, STOW IT or THROW IT! If it is useful and you want to keep it, STOW IT in an appropriate place. If it is just junk, THROW IT in the garbage bucket.

Keep a sharp eye out for FOD! ■

AirspaceCORNER

I have two questions concerning the operation of Glider category aircraft in and around certain classes of airspace.

First, it is my understanding that Gliders are not exempt from the transponder requirements of FAR § 91.215 when operating above the ceiling of Class C airspace upward to 10,000 feet MSL. There seems to be a misunderstanding that the Mode C Veil exemption for gliders operating outside Class B airspace also applies to the above mentioned situation. Am I correct in believing that the transponder requirement applies to gliders operating above Class C airspace below 10,000 feet MSL.

My second question concerns FAR § 91.309(a)(4). This regulation seems to indicate that an FAA FSS must be notified before conducting glider towing operations within Class E airspace even if no control tower exists for that airport. We operate within Class E airspace of an uncontrolled airport. Are we required to contact the FSS before conducting towing operations regardless of weather conditions?

Billy Singleton
Birmingham, AL

Gliders must be equipped with an operating transponder when operating above the ceiling of Class C airspace upward to 10,000 feet MSL, unless the glider was not originally certificated with an engine-driven electrical system, or which has not subsequently been certified with such a system installed [FAR § 91.215(b)(5)]. FAR § 91.309(a)(4) requires that the pilot in command must notify the control tower before conducting glider tow operations within the lateral boundaries of the surface areas of Class B, C, D, or E airspace designated for an airport. At airports where a control tower does not exist or is not operating, the FAA Flight Service Station (FSS) servicing that airspace shall be notified. (The specific FSS is listed in the *Airport/Factility Directory.)* Please note that the FSS does not approve or disapprove these operations; they simply pass along the information to other pilots who may be operating in the area. In addition, this requirement is in effect regardless of the current weather conditions.

• PIC Sign Off

A pilot friend has challenged my assertion that a licensed private pilot with a SEL rating may log PIC time when handling the controls of a high-performance airplane without a high-performance signoff in that pilot's logbook. Please understand that this pilot would not be acting as PIC.

Specifically, my friend allowed a private pilot without a high-performance signoff to fly (handle the controls) of his Piper Dakota while they were on a cross-country flight. My friend, who rented the aircraft, was acting as PIC.

May the SEL pilot log as PIC that time while he was "flying" the aircraft?

David L. Miller
Tujunga, CA

You are correct. Since the private pilot held a category and class rating for airplane SEL, he/she was authorized to log the total flight time, during which he/she was sole manipulator of the controls of the airplane. The pilot cannot be PIC under FAR 1.1, however, until he/she has complied with the requirements of FAR § 61.31(e) for high performance airplanes.

FAA AVIATION NEWS welcomes comments from its readers. We may edit letters for style and/or length. We will select a representative letter from those on the same topic for publication, and because of our publishing schedule, responses may not appear for several issues. We will not print anonymous letters, but we will withhold names or send personal replies upon request. Address: Editor, FAA AVIATION NEWS, AFS–810, Washington, DC 20591. FAX (202) 267–9463.

We take exception to your comment about your friend who rented the aircraft and was "acting" as PIC. Since the pilot who was allowed to manipulate the controls could not be PIC, your friend was PIC under FAR § 1.1, with all the responsibilities and legal obligations that being PIC means under the FAR.

• Fueling Comments

I read "Hand Prop" in the January/February 1994 issue and would like for you to add another step to your list of ten suggestions. It could be 1–A. "Turn off the fuel selector." All aircraft have fuel selector switches, and all aircraft I know of will run at idle for two to five minutes before fuel starvation occurs. This is the best way to prevent runaway aircraft. At full throttle and fuel off, I've never had an engine run more than 30 seconds. I teach this technique and have for more than 45 years. There is plenty of time to remove ropes and chocks, climb into the seat, and then turn on the fuel selector. The only operation you can't perform is "primer".

Another comment that should have been mentioned is the possibility of a broken P-lead, or a bad switch. Magnetos will fire without proper grounding and there lies the danger.

The word loosely grasp is ludicrous. If there is no more compression in the engine than that, you had better forget the whole effort.

Most aircraft have enough battery power left to engage the starter gear and have it bind up. If the gear is stuck, you should with care release it if able. Sometimes rocking the prop back and forth will help release the gear.

Excellent article. The subject is often neglected.

Bruce Couillard
East Stroudsburg, PA

Thanks for the suggestions, but remember to follow any handprop guidelines that appears in the POH.

Two comments: Anytime pilots turn off a fuel switch they have to remember to TURN IT BACK ON BEFORE TAKE-OFF. As Mr. Couillard said some aircraft can run for a few minutes with the fuel

turned off. We can envision a situation where someone might have enough fuel to do a quick takeoff and then run out of fuel in the tree tops at the end of the strip.

The final comment is about rocking the prop. Anytime anyone is around or touches a prop, that person must be prepared for the possibility that the engine could start if the prop is moved.

• Koch Strikes Again

Thanks for answering my inquiry about the use of parachutes when photographing spins (Koch's Komments Kontinued, page 23 of the January-February 1994 issue), but I am still not clear about the legality of this flight. Mr. Koch says that the flight met the appropriate rules when the flight was made, but, for my own education, could you tell me how the flight was legal in light of FAR § 91.307(c) and (d)?

I don't mean to be picking at anybody about this, but I can guarantee that the local FSDO would go after me if I tried this.

Chuck Jamieson
Metairie, LA

FAR § 91.307 and its former designation of FAR § 91.15 applies to civil aircraft. The aircraft used during the FAA mission was operating as a public aircraft, thus old FAR § 91.15 did not apply.

• ADCUS Procedures

On a recent trip in a NORDO J3, I chose to enter the U.S. at Odgensburg, NY, departing from Rockcliffe on a VFR flight plan with ADCUS notation. We arrived about midday, within a couple of minutes of our ETA to find a deserted field with a closed FBO office. The FBO appeared in about half an hour. I called Customs and was told I was in big trouble and he would be there when he was ready.

He appeared in about 20 minutes and launched into a tirade about my duty as PIC to notify him directly by phone and the possibility of a substantial fine (about $5,000 as I recall). In response to a direct question he conceded he had received notice of our arrival by ADCUS. Eventually, he "let us off" with a warning—I suspect because both crew members were white-haired, 70 plus, and the Cub was in her 50's.

What is going on here? I accepted the FSS man's word that ADCUS advisories filled the notification requirement, and it was difficult to place a long distance call from a Rockcliffe pay phone.

Does notification by ADCUS fulfill my obligation or not? I have the impression of being trapped in a bureaucratic disagreement between U.S. Customs and the FAA.

Lloyd M. Luke
Fairport, NY

The FAA's Customs notification procedures for international flights are given in the Airman's Information Manual (AIM), paragraph 5–9. Although the AIM states it is a pilot's responsibility to give timely notice to Customs even though a flight plan is given to the FAA, it also says filing a flight plan with the nearest FSS with ADCUS (Advise Customs) in the remarks section is one means of notifying Customs.

Air Traffic Control asked us to remind all VFR pilots to remember to open their VFR flight plans with ADCUS information. If the VFR flight plan is not opened, Customs will not be notified. ATC stated that the genesis of this problem is the numerous places that a pilot can get ADCUS and/or Customs information. In most cases the pilot will use the *Airport Facility Directory* (AF/D)for that information or rely on the specialist to provide the information. These sources do not always provide accurate or complete infomation. The AF/D usually states ADCUS is available, but does not indicate that one, two, or more hours advance notice is required. That one or two hours starts from the time the Flight Plan is activated and sent to the appropriate FSS/AFSS for processing and Customs notification. If the flight time is less than the required advance notification time the pilot is required to call Customs and advise of the intended time of arrival. This is necessary because the Customs Inspectors often must travel many miles in order to clear the aircraft. Late notification may leave the border post shorthanded or not allow enough time for the Inspector to get to the airport prior to the ETA of the aircraft.

This problem is further complicated by the fact that individual Customs offices will change the published guidelines with no formal change of procedures. This can create confusion among the pilots and cause friction between the FSS/AFSS specialist and the responsible Customs office.

Pilots can write for a free copy of the *Guide for Private Flyers* by sending their request to U.S. Customs, Box 7407, Washington, DC 20229.

• Short Field Landings

AC 61–3B stated, with regard to short field landings, that they "are made from the normal traffic pattern, adjusting the pitch attitude to control the airspeed and the power to control the angle of descent." AC 61–50A, apparently quoting from Aerodynamics for Naval Aviators, stated that "Angle of attack is the primary control of airspeed in steady flight" and "Power setting is the primary control of altitude" (in steady flight). However, the Flight Training Handbook (AC 61–21A) states, with regard to short field landings, that "the pitch attitude is adjusted as necessary to establish and maintain the desired rate or angle of descent, and power is adjusted to maintain the desired airspeed." While fully aware of the need for coordinated adjustments of pitch and power, I would like to ask what the FAA's present position is on the primary control of airspeed and altitude respectively.

Cyril Toker
Ponte Vedra Beach, FL

The *Flight Training Handbook* recommends pilots follow the procedures outlined in their approved airplane flight manual or pilot operating handbook. If a recommended procedure is not listed, the FAA's recommendation is: ". . . a coordinated *combination of both pitch and power adjustments* is usually required."

Stay tuned. The *Flight Training Handbook* is being rewritten.

Air traffic controller Mary Anne Mason tries out the PET-2000 back-up radio at Scottsdale, AZ, Tower.

A "Pet" Project

We have all experienced the inconvenience of a summer storm knocking out the electricity for a few hours. And we have all seen how fires, floods, and earthquakes can do the same—usually on a longer-term basis. Did you ever stop to think that if your electricity is gone, then the electricity at the local air traffic control tower or air route traffic control center may also be out? This is not too much of a problem if you are on the ground, but what happens if you are in the air and something "pulls the plug" at the air traffic facility you are speaking with?

The FAA decided they needed a reliable back-up for facilities within the national airspace system (NAS) that might experience power outages or other emergency conditions. The back-up radio would have to operate effectively in high co-location environments with the capacity to communicate on both commercial (VHF) and military (UHF) aircraft frequencies. The transceiver would also have to be highly portable, easy to operate, and function using both AC or DC power sources with a battery back-up to assure long-term operational reliability.

FAA awarded a contract to supply such equipment to Motorola Government and Systems Technology Group in Scottsdale, AZ. The equipment is the Portable Emergency Transceiver (PET)-2000. The PET-2000's are scheduled for deployment throughout air traffic facilities in the NAS 1995 through 1999. The technology is based on field-proven, multi-band equipment used by the U.S. and foreign militaries.

HELLLLP!

from *AeroSafe,* the Seattle FSDO's newsletter

Assume you are making a cross country flight. Once you are far enough away from the airport that you no longer need to communicate, what would you do with your communications radio? We highly recommend you take advantage of ATC Flight Following, but assuming you elect not to use it and have no other use for the communications portion of your radio, would you continue to monitor the last used frequency? Would you turn the volume down to zero? Would you turn the radio off?

We would like to recommend you consider leaving the volume set for comfortable receiving and change to emergency frequency 121.5 or 243 MHz. This will accomplish several things. First, since there is hardly ever any conversation on the emergency frequencies, even with the volume up you have silenced your radio and provided a cockpit environment conducive to conversations with passengers. Second, if someone should transmit an emergency call you may be of considerable help to a pilot in distress. And third, in the unlikely event of your own incapacitation, all your passenger needs to do is key the mike and request assistance. You have already set the volume and there are antennae all over the county monitoring 121.5 or 243 MHz twenty four hours a day.

Due to terrain considerations in some states and the line-or-sight limitations of our radios, there are locations where it is impossible for the FAA to hear 121.5. For this reason we encourage pilots to form their own emergency "network." By tuning unused radios to 121.5 or 243 MHz while in the air you can receive calls that would otherwise go unheard. Such a "network" would greatly increase the chances of getting help to another aircraft in distress.

One word of caution: It is likely the FAA will hear the emergency call and will be responding. You may not hear the FAA response due to the same line-of-sight limitations discussed earlier. If you transmit at the same time as the FAA, you will be blocking the transmission and preventing help from getting to the distressed aircraft. *Listen first before you offer your help. Make sure no one else is responding.*

AOPA's Project Pilot Update

With total participation now numbering 15,000 mentors and students, AOPA Project Pilot is well on its way to its first-year goal with 8,000 prospective pilots enlisted during the program's first eight months.

The 8,000 individuals have been recruited by AOPA members to be mentored through the process of becoming a pilot.

"Project Pilot has exceeded all our expectations. It is delivering results in locating and motivating those who just need encouragement and counsel to get started in flying," said AOPA President Phil Boyer. "Most gratifying is the enthusiasm of the members participating. The program has now linked 15,000 AOPA members and pilot prospects in a partnership that is bringing new people into aviation."

Launched April 1, 1994, as a one-year program, Project Pilot seeks to bring 10,000 additional new people into aviation in one year through personal contacts and one-on-one mentoring by AOPA members.

Some 200 of these prospects have already soloed. And despite the typical six months to one year usually required to complete training, 23 have already earned a Private pilot certificate.

"With this kind of involvement, we expect that Project Pilot will be around for quite a while as a continuing AOPA program," said Boyer.

Airmen Medical Update

In a move to cut regulatory burden and save taxpayers' money, the FAA recently announced plans to lengthen the validity period for third-class airmen medical certificates for many private, recreational, and student pilots.

The FAA plans a comprehensive revision of airman medical standards and certification procedures to better provide for safety in the national aviation system. The revision will reflect current medical knowledge, technology, practice. The changes are based largely on recommendations of a panel of medical experts and many of the recommendations reflect what is already agency policy.

The FAA proposes to lengthen the validity period for third-class medical certificates from two to three years for everyone under 40 years of age. The medical validity period for pilots between the ages of 40 and 69 will remain at two years. Those 70 and over will be required to be examined each year.

The action follows numerous periods of public comment and petitions seeking changes in standards. The FAA asked Johns Hopkins University to prepare a detailed statistical analysis of information the FAA had collected on approximately 31,000 air traffic controllers over a 15-year period. The study sample was comparable to the private pilot population and the tests were similar to airman medical examinations.

According to Federal Air Surgeon, Dr. Jon Jordan, the proposed changes to the medical standards involve vision, hearing, mental, neurologic, and cardiovascular requirements and the scope of examination.

The FAA also plans to publish in the *Federal Register* a notice in which the public is asked to comment on the FAA's consideration of a policy change concerning individuals with insulin-treated diabetes mellitus who apply for medical certification.

Fuel Storage in Non-flying Aircraft

Recently an engine overhaul shop expressed concern about the condition of several aircraft carburetors it had serviced. The carburetors had been removed from an aircraft which had been using auto fuel and which had not been flown for over a year. The auto fuel had broken down and left a gummy residue in the carburetor bowls. The needle valves were gummed into their seats so tight that pliers had to be used to remove them. The metal floats, up to the fuel level, were covered in a black residue. Above the fuel level, corrosion on one float was serious enough to necessitate replacement. This resulted in a three-month wait for parts and a repair cost of over $600 for each carburetor.

There have been several other less severe examples of this problem reported, likely due to shorter storage times. The amount of gumming may depend on the type of auto gas used and will definitely depend on the length of time that the aircraft is in storage.

Auto gas dealers state that auto fuel should be used within six months. So, if you have been using auto fuel and intend on storing your aircraft for a period of time, switch to avgas before putting the aircraft away. A few liters [or gallons] of avgas are cheaper than carb repairs or an accident.

The problem can also occur with avgas over an extended period of time, but the deterioration is much slower. So, if you intend to put your aircraft into long-term storage, consult the *Maintenance Manual* or contact the aircraft manufacturer.

EAA Offers Extensive Scholarship Program

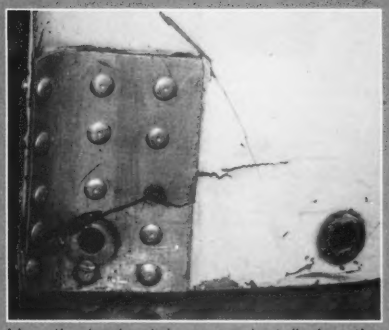
The EAA Aviation Foundation is again offering an extensive scholarship program in 1995. The scholarships are earmarked for young people interested in aviation-related academic and technical studies.

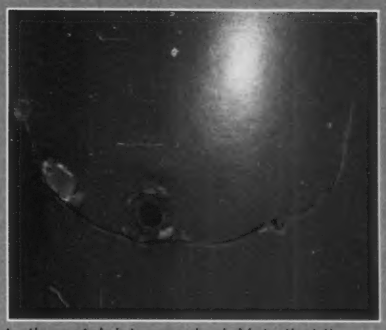
The scholarships recognize pursuit of knowledge and careers in aviation technologies and skills. They provide assistance to deserving individuals who demonstrate a financial need to accomplish their goals. The amounts range from modest grants to awards supporting full four-year programs.

"Today's young people continue to show enthusiasm for aviation-related careers," said EAA Aviation Foundation President Tom Poberezny. "We want to encourage and nurture that enthusiasm to help ensure a strong future for aviation. These scholarships can set a student on the path toward becoming a pilot, airframe and powerplant technician, administrator, or engineer."

The Foundation's scholarship program is open to all young people interested in aviation careers. Applicants should show involvement in school and community activities in addition to an interest in aviation. Academic records will also be reviewed as part of the scholarship award process.

Applications for the scholarship program or additional information may be obtained from the EAA Aviation Foundation Education Department, EAA Aviation Center, P.O. Box 3065, Oshkosh, WI 54903–3065, or call (414) 426–4888. The application deadline is April 1, 1995.





Unauthorized patches were installed on the spinners in the left and center photos. In the left photo the patch later cracked. Note that the spinner on the right appears to have developed a crack, was stop drilled, and the crack progressed.

A Prop "Quiz" on Spinners

by Ray Cloutier, *FAA Aviation Safety Inspector-Airworthiness*

How much do you know about your prop and its spinner? If you fly a prop aircraft, we hope you know a lot. But some pilots and A&P's may not be as familiar with all of the subtleties of prop care and especially its spinner as they should be. This photo "quiz" should give you some things to think about the next time you check your prop's spinner. Although we have all been told to check our props for nicks, gouges, and other signs of damage and stress, not much is said about spinners. Spinners may be the "Rodney Dangerfield" of aviation. We check to see if one is attached, but it gets no respect.

These photographs show some of the common problems and lack of respect some spinners have received.

- Do you recognize your spinner in any one of these photographs?
- Does your spinner have a patch on it?
- Does it have a crack in it that has been stop drilled?
- Is part of it missing?
- Does it have dents or nicks in it?
- Are any of the mounting screw holes elongated or worn?
- Are any of the mounting screws missing?
- Do you push it around and abuse it?

If you answered, "Yes," to any of these questions, you may have a problem. We say may, because some aircraft manufacturers have no authorized procedures for repairing a damaged spinner. Most manufacturers don't approve the repair of a spinner. But some do. You may also be damaging your spinner needlessly.

The problem with spinners is balance. Since a spinner is a dynamic part of the propeller installation, it must be balanced to rotate at prop RPM. Improper repairs can cause an out of balance situation that can cause excessive vibration in the spinner-propeller combination that can lead to other problems.

Spinners also play an important role in directing airflow to the engine. Damage to the spinner may disturb some of that airflow.

In talking about spinners, we cannot forget the spinner backing plate that attaches the spinner to the propeller. The backing plate is as important as the spinner. It also has to be airworthy and in balance. Although out of sight, there should be no cracks in it or any unauthorized repairs to it either.

In checking their spinners, pilots and everyone working around prop aircraft should be aware of one of the most common causes of spinner damage. Pilots or line people pushing against spinners to move aircraft probably damage more spinners than all other causes. So, one of the best ways to avoid damaging your spinner is to never push against it when moving your aircraft. That is what towbars are made for.

Pilots should carefully check their spinners for damage and attachment when preflighting their aircraft. You should also check for missing or loose screws. Both can lead to further damage.

A word of caution though for anyone working around, preflighting, or touching a prop or its spinner. Prop movement on an engine with a defective magneto ground could result in an engine start with deadly consequences. If you are going to work on or around a propeller and its spinner, you should disable the engine for maximum safety.

If you find your spinner is damaged or matches one of the photos, what can you do? First, you should check and follow your aircraft manufacturer's recommendations. Some manufacturers have authorized spinner repair procedures. You can check with an FAA authorized repair station to see if it has factory-approved data for repairing your specific spinner. You can also check with your local FAA Flight Standards District Office for additional advice or for a list of FAA approved repair stations or DER's in your area.

Because of the importance of the spinner on any prop-equipped aircraft, only FAA authorized, factory-approved repairs should be made to those spinners that can be repaired. Although spinners aren't cheap, a damaged or improperly repaired one that leads to an incident, accident, or an unairworthy aircraft is a false economy that no one can afford. ■

United States Government Printing Office

Superintendent of Documents

Washington, D.C. 20402

Official Business
Penalty for Private Use $300

FAN SERIA300S MAR95 R 1
SERIALS PROCESSING
UNIV MICROFILMS INTL
300 N ZEEB RD
ANN ARBOR MI 48106

BULK RATE
POSTAGE & FEES PAID
GPO
PERMIT NO. G-26

DO NOT DELAY—CRITICAL TO FLIGHT SAFETY!